Clause 9 in Report No. 4 of Committee of the Whole was adopted, without amendment, by the Council of The Regional Municipality of York at its meeting held on March 23, 2017.

9

# 2016 Drinking Water Systems Report

Committee of the Whole recommends:

1. Receipt of the presentation by David Szeptycki, Director, Strategy and Innovation and Roy Huetl, Director, Operations Maintenance and Monitoring.

2. Adoption of the following recommendation contained in the report dated February 16, 2017 from the Commissioner of Environmental Services:

    1. The Regional Clerk circulate this report to the local municipalities and the Ontario Chief Drinking Water Inspector (MOECC).

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Report dated February 16, 2017 from the Commissioner of Environmental Services now follows:

## 1. Recommendation

It is recommended that:

1. The Regional Clerk circulate this report to the local municipalities and the Ontario Chief Drinking Water Inspector (MOECC).

## 2. Purpose

This report and included attachments, satisfies reporting requirements in Ontario Regulation 170/03 – Drinking Water Systems, and helps Council to meet its Standard of Care requirements in the *Safe Drinking Water Act, 2002*.

# 3. Background

## *Safe Drinking Water Act* requires drinking water system owners to report annually on system performance to Council and the public

The Ministry of the Environment and Climate Change (the Ministry) regulates the operation of drinking water systems in Ontario. The *Safe Drinking Water Act, 2002,* (the Act) requires municipal drinking water system owners to report annually on the quality and quantity of drinking water produced. The regulatory requirement is satisfied through this report, as well as publication of the 2016 Drinking Water Systems Report (Attachment 1) and Annual Reports to satisfy Section 11 of the Drinking Water Systems regulation, which are available to the public online through York Region's Drinking Water webpage, at york.ca/drinkingwater.

## Report helps Council exercise due diligence and meet its Standard of Care under the Act

Councillors have an important role to play in ensuring York Region's drinking water systems provide safe, high quality drinking water. In 2000, seven people died and thousands became ill from municipal drinking water contaminated with E. coli in Walkerton, Ontario. The Province then developed the *Safe Drinking Water Act, 2002,* to reduce the risk of drinking water related illness. A key recommendation is a multi-barrier approach, including source water protection, training of operators, a quality management system, and a strong inspection and enforcement program. For more information on source water protection, refer to the 2016 Annual Report on Source Protection Implementation.

The Act imposes a Standard of Care upon individuals with decision making authority over municipal drinking water systems. Consequently, Council is required to demonstrate a level of care, diligence and skill over the delivery of water services that a reasonably prudent person would be expected to exercise in a similar situation.

This report summarizes for 2016:

- Annual Drinking Water Systems Report on water volume and capacity for York Region's drinking water systems (Attachment 1)
- Reported adverse water quality events and associated corrective actions (Attachment 2)
- Ministry inspection summary of findings and associated corrective actions (Attachment 3)

- Process improvements to enhance operational diligence and collaboration to continually improve safe drinking water operations

- Major drinking water system expenses incurred

## York Region's Medical Officer of Health oversees reported events to monitor potential public health risks from drinking water

The Region's Medical Officer of Health plays a key role in the reporting process for adverse water test results. The Medical Officer of Health assesses any potential health impact from an adverse test result, and may direct the owner of a drinking water system to take corrective actions beyond what is prescribed by regulations.

In the event of a water emergency, there would be close cooperation between the Medical Officer of Health, the Region and the Ministry to ensure effective communication with the public to protect public health. Environmental Services and Public Health maintain a 24/7 response process to address potential water quality issues.

## Multi-barrier approach to risk management includes a Quality Management System

The Act requires that all municipal drinking water systems in Ontario meet the Province's Drinking Water Quality Management Standard. The Standard is designed to protect public health by following consistent practices for managing and operating water systems.

York Region's drinking water systems are also registered with International Organization for Standardization (ISO) 9001 Quality Management Standard and are accredited to Ontario's Drinking Water Quality Management Standard. The Integrated Management System combines these standards into one management system. The combined system of standards helps to mitigate risk of impacts to the environment and supports delivery of safe drinking water, while highlighting opportunities for continual improvement and maintaining compliance.

Following the practices and principles of Environmental Services' Integrated Management System, operational reporting and record keeping practices are continually re-evaluated to support the pursuit of efficiency and due diligence. Environmental Services addresses challenges by using the tools of the Integrated Management System and by empowering staff to work together to proactively solve problems. For example:

- Adverse events are reported whenever a test parameter is measured outside regulatory ranges

- Staff monitor all reported events to identify possible trends in equipment performance or gaps in operational procedures that may require updating

- Lessons learned from events or trends are routinely incorporated into updated procedures and practices

The 2016 Integrated Management System Update Report, (also on this agenda) provides more information on the system and how it helps York Region provide safe drinking water.

## York Region's drinking water sampling program and monitoring tools protect public health and safety

York Region uses a variety of monitoring methods to address the unique needs of each water system. Online analyzers and a comprehensive sampling program allow staff oversight of individual facilities. Enhanced monitoring above minimum regulatory requirements provides valuable information that is used to support our industry leading drinking water operations. Some examples include:

- Online analyzers continuously monitor many regulated parameters, and automatic shut offs stop the flow of drinking water when these parameters approach regulatory limits

- A comprehensive sampling program includes both regulatory and research samples and is frequently updated in response to operational needs and regulation changes

- Analyzers and dosing equipment are calibrated during regularly scheduled preventive maintenance and are recalibrated by trained operators as needed to ensure accurate readings

# 4. Analysis and Implications

## PROCESS IMPROVEMENTS

### A more rigorous approach to reporting improves compliance, transparency and risk mitigation

Adverse water quality events themselves are not non-compliance occurrences, but failing to report them is a non-compliance with potential penalties. Staff and the Ministry worked together to clarify requirements for reporting adverse water quality events to strengthen transparency to the Ministry, the Medical Officer of Health and the public. As a result of this improved understanding, increased reporting of events reported by staff are explained below:

- Some events are now reported that were not previously considered reportable. An example is high chlorine reading on an analyzer requiring maintenance. Operators always responded to correct these events in the past, however, now these events are also reported to the Ministry and the Medical Officer of Health.

- Many events reported in 2016 are due diligence reports not required by regulation. An example is a high chlorine reading at a well facility after the flow was halted by the automatic lockout. Casting a wider net to include due diligence reports ensures compliance with regulations and allows early line of sight to potential water quality challenges. It also further demonstrates operator commitment to public wellbeing.

- An in depth training program on adverse water quality reporting was delivered for all licenced operators in 2016. The program included classroom training and on the job mentoring with support from subject matter experts and senior staff.

The Region's Operator training program provides practical experience and structured learning to empower staff with the tools and knowledge they need to continue to provide safe drinking water. It also satisfies the regulatory requirements for operator training under the Act.

## WATER QUALITY TESTING

### Public health and safety was not compromised during any reported adverse water quality event

York Region reports all adverse water quality parameters and observations to the Ministry and the Region's Medical Officer of Health, as required by regulation.

The strong working relationship between Public Health, the Ministry and the operations teams is demonstrated with:

- Quick operator response and transparent communication for all events
- No additional corrective actions directed for any reported event by the Ministry or by the Medical Officer of Health
- Regular collaboration between Environmental Services, the Ministry, and Public Health for action plans and process improvements
- No water advisories have been issued in more than a decade

## 99.87 per cent of laboratory analyzed samples in 2016 complied with regulated standards and confirm York Region's high quality drinking water continues to be safe

In 2016, York-Durham Laboratory performed 18,489 water quality tests for York Region's drinking water systems, resulting in only 25 reported adverse test results. This means 99.87 per cent of all samples collected and analyzed in 2016 complied with regulated standards. The laboratory initiates the reporting process when analysis indicates a parameter is outside regulatory limits. Staff responded to each adverse test result and performed corrective actions accordingly.

Attachment 2 includes a list of all adverse laboratory samples and the corrective actions taken by staff. Figure 1 and Table 1 summarize the laboratory analyzed water quality test results reported as adverse water quality events in 2016.

Figure 1

**Adverse Water Quality Events Reported from Laboratory Analyzed Test Results in 2016**

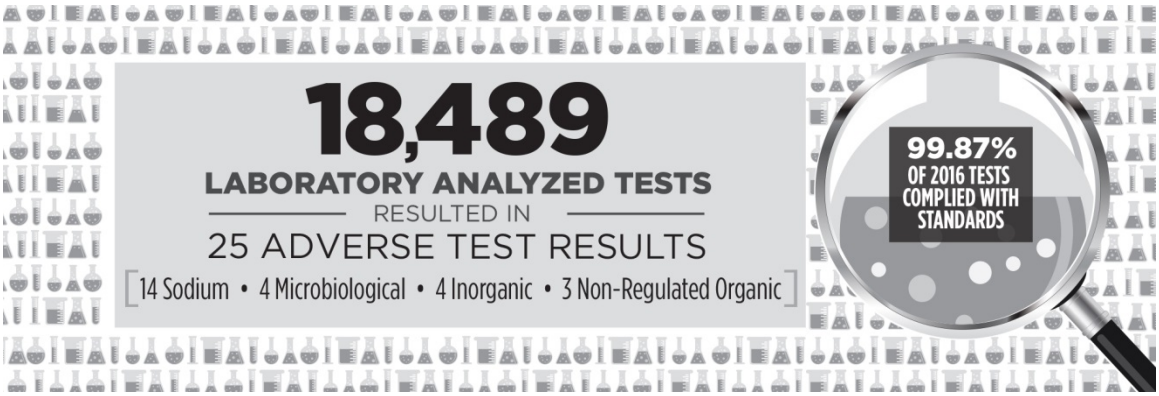


**Table 1**
**Adverse Water Quality Events Reported from Laboratory Analyzed Test Results in 2016**

| Parameter | Discussion |
|---|---|
| Sodium<br>(14 of 25) | • Sodium levels above 20 mg/L must be reported<br>• 14 facilities reported sodium levels between 20 mg/L and 55 mg/L<br>• Health Canada aesthetic objective maximum for sodium in drinking water is 200 mg/L. Most healthy adults require 1500 mg per day. Average results for all systems are updated annually for public reference.<br>• Requirement is to report adverse sodium once per system. Sodium levels were reported for all facilities over the limit within each system, resulting in 7 reports filed not required by the regulation. Procedures have been updated to reflect this change in reporting practice. |
| Microbiological<br>(4 of 25) | • Total Coliform bacteria detected in Kleinburg and Newmarket. Resamples taken as soon as the Region was notified of the results. All resamples confirmed absence of Total Coliform.<br>• E. coli was not detected at any Regional water facilities<br>• Additional preventive maintenance was conducted at these facilities as an extra precaution |
| Non-Regulated Organic Compound<br>(3 of 25) | • Detection of any chemical not regulated under the Ontario Drinking Water Quality Standards must be reported<br>• Two new organic compounds were detected during baseline or research sampling<br>• 2,3,4,5 – Tetrachlorophenol (TeCP) was detected at trace amounts at the Georgina Water Treatment Plant. It is common in Canadian surface water and does not have a regulated standard or limit.<br>• 2-methyl-4-chlorophenoxyacetic acid (MCPA) was detected at trace amounts in Nobleton and the Georgina Water Treatment Plant at less than 10 per cent of the new limit that will take effect in 2017. Resample results were non-detectable in Nobleton and concentration remained trace at the Georgina Water Treatment Plant.<br>• The Region continues to support the Ministry's research on water quality at the source and in the distribution systems |

| Parameter | Discussion |
|---|---|
| Inorganic Parameter<br>(4 of 25) | • High nitrate was reported for Aurora three times. These results were due to sampling error. Resample results were non-detectable for nitrate.<br>• Lead was reported for Stouffville once. This sample was collected from non-potable plumbing during a research study for the Ministry. Staff resampled from a potable water source, resulting in non-detectable for lead.<br>• Operators participated in reviewing sampling procedures for accuracy and clarity to prevent recurrence |

## System performance is monitored continuously and automatic safeguards stop water flow when approaching regulatory limits

In addition to manual sampling, 300 online analyzers continuously monitor system performance with the ability to automatically and immediately trigger facility lockouts. Analyzers monitor several parameters, including chlorine residual which is also known as disinfection level. These analyzers created approximately 31 million records in 2016.

Analyzers send real time information to operations staff and shut down distribution when a parameter is detected near or outside regulatory limits. A team of control panel operators monitor the system and dispatch field operators to respond to alarms or unusual trends. Facilities can only return to operation after an operator attends the site to inspect the equipment, manually test the water quality and complete any other corrective actions.

## 99.99 per cent of analyzer readings complied with regulated standards and demonstrate effective system performance

Staff reported 89 adverse system performance events in 2016. In every occurrence, the flow of water was stopped upon alarm. Analyzers record point in time measurements. Occasional high or low readings on an analyzer are not representative of overall disinfection level in the distribution system.

- More than half of the events self-corrected or required minor adjustment, and required no operator intervention aside from confirming compliant readings and restarting the facility

- 41 events were reported as due diligence or best management practice

Attachment 2 includes the reported system performance events detected with continuous monitoring and the actions taken to correct them. Figure 2 and

Table 2 summarize the continuously monitored analyzer readings reported as adverse water quality events.

**Figure 2**

**Adverse Water Quality Events Reported from Continuous Monitoring Analyzer Readings in 2016**


**Table 2**

**Adverse Water Quality Events Reported from Continuous Monitoring Analyzer Readings in 2016**

| Parameter | Discussion |
|---|---|
| High Chlorine Residual (high disinfection) (51 of 89) | • Many high residual events were from facilities operating near the upper regulatory limit. This practice improved disinfection in the areas furthest from the treatment source during watermain maintenance. The local Medical Officer of Health, the Ministry and local municipalities were consulted when planning this action, and staff followed direction for additional monitoring. |
| Low Chlorine Residual (low disinfection) (21 of 89) | • Most low disinfection events include equipment error as a major contributing cause |
| High Fluoride (7 of 89) | • Fluoride is monitored and reportable in Georgina and Keswick, where it is applied at the optimal level recommended by the Province and the Medical Officer of Health to prevent tooth decay<br>• Fluoride readings above the optimal level recommendations trigger immediate facility shut down<br>• For each event, an operator backflushed the system to prevent any water from leaving Regional property and restored the correct dose |

| Parameter | Discussion |
|---|---|
| Low System Pressure<br>(10 of 89) | • Most low pressure events are brief due to change in flow direction<br>• Low pressure was reported as a best management practice. In 2016, the Region received permission from the Ministry to no longer report low pressure<br>• The Region continues to investigate and respond to low pressure events, and will report adverse system conditions if there are negative impacts to the system |

## INSPECTIONS

### York Region ranks first in the Greater Toronto Area for the Ontario Chief Water Inspector's 2015-2016 Annual Report

Ontario's Chief Drinking Water Inspector releases an annual report rating for drinking water systems. Reporting timelines are based on the Province's previous fiscal year from April 1, 2015 to March 31, 2016. York Region achieved top compliance scores for Ministry inspections and for samples meeting provincial water quality standards.

- York Region scored 100 per cent inspection rating for 13 of 15 systems, with an average rating of 99.73 per cent for all systems combined

- Two systems, Ballantrae and Mount Albert, received a score of 97.98 per cent resulting from a minor noncompliance finding. One quarterly sample set was taken three days late in those two systems. All other samples in 2016 were collected within the regulated time frame.

- York Region scored 100 per cent on samples meeting provincial water quality standards for 14 of 15 systems, with an average rating of 99.96 per cent for all systems combined

- One system, Aurora, received a score of 99.45 per cent for samples meeting provincial water quality standards. One quarterly nitrate-nitrite sample set was preserved incorrectly, however, resample results were undetectable.

The City of Toronto and Peel Region, which provide drinking water to the York Water System, also received high scores.

Attachment 3 explains the findings and any corrective actions for Ministry inspections conducted in the 2016 calendar year. Inspectors evaluate facilities against regulations, licenses, permits and Ministry procedures. As demonstrated in Table 3, York Region continues to receive high marks on Ministry inspections

and sampling results, consistently leading the Province along with our Greater Toronto Area municipal partners.

**Table 3**
**Ministry of the Environment and Climate Change**
**April 2014 – March 2016 Inspection and Water Quality Test Ratings**

| Municipality | 2014-2015 Inspection Rating (%) | 2015-2016 Inspection Rating (%) | 2014-2015 % Drinking Water Quality Tests Meeting Standards | 2015-2016 % Drinking Water Quality Tests Meeting Standards |
|---|---|---|---|---|
| York Region* | 99.09 | 99.73 | 99.99 | 99.96 |
| Peel Region* | 98.17 | 96.26 | 99.99 | 99.95 |
| City of Toronto* | 100.00 | 97.46 | 99.45 | 99.65 |
| Durham Region* | 98.49 | 99.72 | 99.95 | 99.94 |
| Provincial Average | 98.33 | 98.49 | 99.85 | 99.89 |
| Provincial Minimum | 77.84 | 65.16 | 93.44 | 98.04 |

* Average of scores for all drinking water systems within municipality.

### Pending finding regarding operator licence

Through routine tasks under the Integrated Management System, management became aware of an issue relating to an operator licence, which had lapsed due to administrative reasons. Staff notified the Ministry and corrective actions have been taken. At no time was public health at risk.

## VOLUME & CAPACITY

### All drinking water systems operated within all permitted water volume and capacity limits in 2016

In 2016, all of York Region's drinking water systems operated within the monthly average flow, maximum daily withdrawal and allowable daily withdrawal limits. York Region continues to maintain compliance with:

- The *Safe Drinking Water Act, 2002* and its regulations
- Terms and conditions of the Region's Permits to Take Water and supply agreements with the City of Toronto and Peel Region

- The permitted Intra-Basin Transfer volumes for water taken from (and returned to Lake Ontario) for communities in the Lake Huron watershed

York Region continues to secure sufficient drinking water capacity for the Region's growing population. Maximum permitted volumes in long term agreements aligns with forecasted population growth to 2041 and beyond.

York Region did not declare a water use restriction during the high demand drought period in summer 2016. Staff carefully balanced flows from available sources within capacity and compliance limits to maintain sufficient reserves in water storage facilities.

### Public education and outreach programs about water conservation help York Region maintain compliance

Water conservation programs such as "Water for Tomorrow" and "Water Is" educate consumers on responsible and efficient water conservation. The "Water Heroes" series reveals the people behind the infrastructure and raises awareness of the everyday challenges staff face when sourcing, treating and distributing water. As a result of responsible consumer use and efficient Regional operation, all residents, businesses and visitors to the Region can enjoy a steady supply of clean water for many years to come.

### Open and responsive government is achieved by releasing the Drinking Water Report through Open Data

Open data is the release of easy to access government data for public use. Open data increases transparency, promotes understanding of government and fosters trust by proactively making data publicly available. It helps to raise the profile of regional government as a self-serve and reliable source of data. Publishing the report through Open Data meets the 2015-2019 Strategic Plan objective to increase the number of datasets online and increase visits to Regional websites. It also supports the Vision 2051 Goal Area of Open and Responsive Governance. The 2015 drinking water dataset was published in 2016.

## 5. Financial Considerations

### Effective asset management is critical to delivering reliable and sustainable water services

York Region delivers high quality drinking water in a safe and efficient manner. The estimated replacement cost for York Region's water facilities is approximately $1.6 billion, accounting for approximately 14 per cent of all the Region's assets. Effective asset management, including infrastructure

maintenance, is critical to the Region's ability to deliver services that are safe, reliable and efficient while sustaining our growing communities.

Environmental Services' Infrastructure Asset Management and Capital Planning and Delivery groups work closely with the Operations, Maintenance and Monitoring group. Together, the groups manage safe and responsible growth by identifying critical points in the systems, planning and prioritizing upgrades, repairs and expansions, while maintaining operational excellence.

In October 2015, Council approved new annual water and wastewater rates supported by a detailed analysis described in the Financial Sustainability Plan. The plan focused on achieving full cost recovery pricing and eliminating shortfalls in asset management funding.

## York Region spent $18.4 million in 2016 to maintain and improve drinking water systems

Section 11 of the Drinking Water Systems regulation requires water utility owners to "describe any major expenses incurred during the period covered by the report to install, repair or replace required equipment."

In 2016, York Region spent $18.4 million installing, repairing or replacing equipment used to treat, store and deliver safe drinking water. These expenses are summarized below in Table 4. These costs are funded through the rate supported Environmental Services water budget, as approved annually by Council.

**Table 4**
**Summary of Major Expenditures for the Drinking Water Systems in 2016**

| Drinking Water System (DWS) | Installation, Repair or Replacement Activity | Expenses |
|---|---|---|
| Ansnorveldt DWS | General maintenance and repair; SCADA upgrades. | $38,413 |
| Ballantrae/Musselman's Lake DWS | General maintenance and repair; SCADA upgrades. | $139,802 |
| Mount Albert DWS | General maintenance and repair; SCADA upgrades. | $330,440 |
| Nobleton DWS | General maintenance and repair. | $65,968 |
| Schomberg DWS | General maintenance and repair. | $96,551 |
| **York DWS** | | |
| Vaughan, Richmond Hill, Markham communities | General maintenance and repair; Bayview Pumping Station upgrades; works on York-Peel feedermain; partial replacement of Bathurst watermain; East Vaughan Pumping | $7,878,011 |

| Drinking Water System (DWS) | Installation, Repair or Replacement Activity | Expenses |
|---|---|---|
| | Station and Kennedy watermain construction. | |
| Aurora sub-system | General maintenance and repair; Aurora East elevated tank upgrades; Ridge Road Pumping Station upgrades. | $2,689,570 |
| Holland Landing sub-system | General maintenance and repair; Sherwood Forest Pumping Station upgrades; SCADA upgrades. | $915,045 |
| King City sub-system | General maintenance and repair. | $12,157 |
| Kleinburg sub-system | General maintenance and repair; well upgrades and elevated tank recoating. | $1,190,969 |
| Newmarket sub-system | General maintenance and repair; flow meter installation at Davis Drive chamber; Yonge Street aquifer rehabilitation; Leslie St. watermain repair. | $1,607,977 |
| Queensville sub-system | General maintenance and repair; SCADA upgrades. | $283,924 |
| Stouffville sub-system | General maintenance and repair; SCADA upgrades. | $1,276,463 |
| **Georgina DWS** | | |
| Lakeshore, Sutton Communities | General maintenance and repair; Georgina Water Treatment Plant upgrades. | $587,766 |
| Keswick sub-system | General maintenance and repair; Keswick Water Treatment Plant upgrades. | $1,286,293 |
| **Total** | | $18,399,349 |

## 6. Local Municipal Impact

### York Region and the nine local municipalities work together to distribute high quality drinking water

Water quality standards are maintained by collaboration between York Region and local municipal staff during maintenance and expansion of the drinking water systems. Although ownership and operation of the systems is two-tiered, the Region and the local municipalities coordinate operation of the systems as one single process to provide safe and uninterrupted water supply to their customers.

Regional staff provided copies of the Ministry's Section 11 water quality reporting forms to the nine local municipalities to meet the February 28, 2017 regulatory

deadline. Following Council approval, copies of this report and attachments will also be provided to local municipal staff.

## 7. Conclusion

This report and all attachments, along with Section 11 reporting forms posted on york.ca/drinkingwater, satisfies reporting requirements under the Act. Council is able to demonstrate due diligence required for decision making under the Statutory Standard of Care by reviewing and considering the information on the Region's drinking water systems contained in this report when exercising decision making authority.

York Region's drinking water systems are subject to strict regulations implemented by the Province of Ontario to keep drinking water safe. Results from the 2016 reporting year continue to prove the excellent performance of York Region's drinking water systems. This report demonstrates the Region's commitment to operational excellence through continuous improvement, while also fulfilling our obligation to communicate performance to Council, stakeholders and the public.

For more information on this report, please contact David Szeptycki, Director of Strategy and Innovation at 1-877-464-9675 extension 75723 or Roy Huetl, Director of Operations, Maintenance and Monitoring at extension 75323.

The Senior Management Group has reviewed this report.

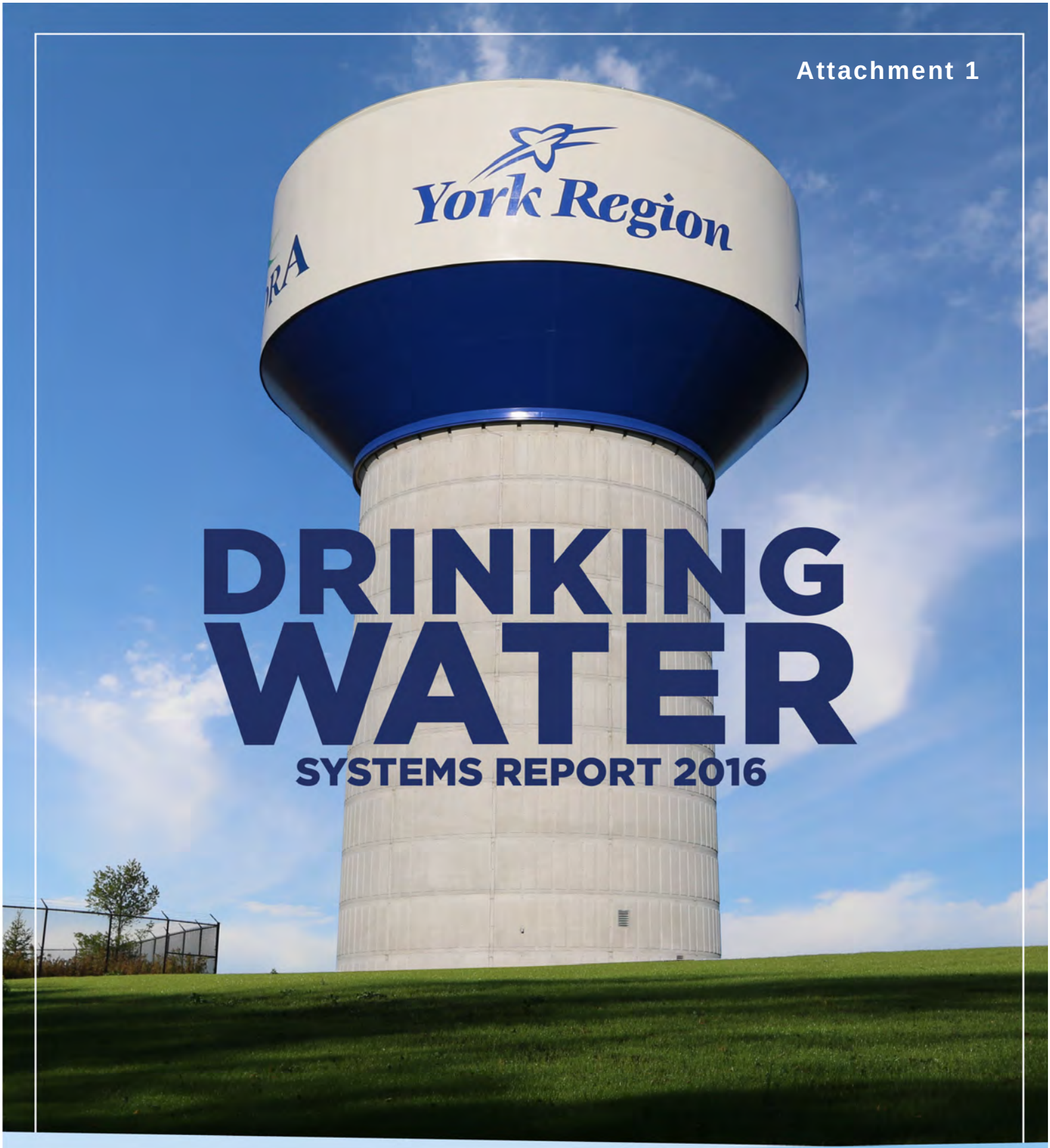
February 16, 2017

Attachments (3)

#7317383

Accessible formats or communication supports are available upon request

Attachment 1




# DRINKING WATER

## SYSTEMS REPORT 2016

york.ca

#wateris

York Region

Keeping our water safe

Accessible formats or communication supports are available upon request.
Please contact AccessYork@york.ca or call 1-877-464-9675.

A copy of this report is available at the Environmental Services Department located at the York Region Administrative Centre or online at york.ca

# Table of Contents

# Introduction

York Region is responsible for the supply, production, treatment, storage and transmission of drinking water to its nine partner municipalities: Town of Aurora, Town of East Gwillimbury, Town of Georgina, Township of King, City of Markham, Town of Newmarket, Town of Richmond Hill, City of Vaughan, and Town of Whitchurch-Stouffville. These local municipalities distribute the high quality drinking water to residential, industrial, commercial and institutional customers within their communities.

York Region provides residents and businesses with safe uninterrupted drinking water supply by operating and maintaining:

- Three water treatment plants
- 45 water storage facilities (elevated tanks and reservoirs)
- 40 production wells
- Approximately 350 kilometres of transmission mains

York Region is also committed to effective wastewater treatment to protect sources of drinking water, and maintains:

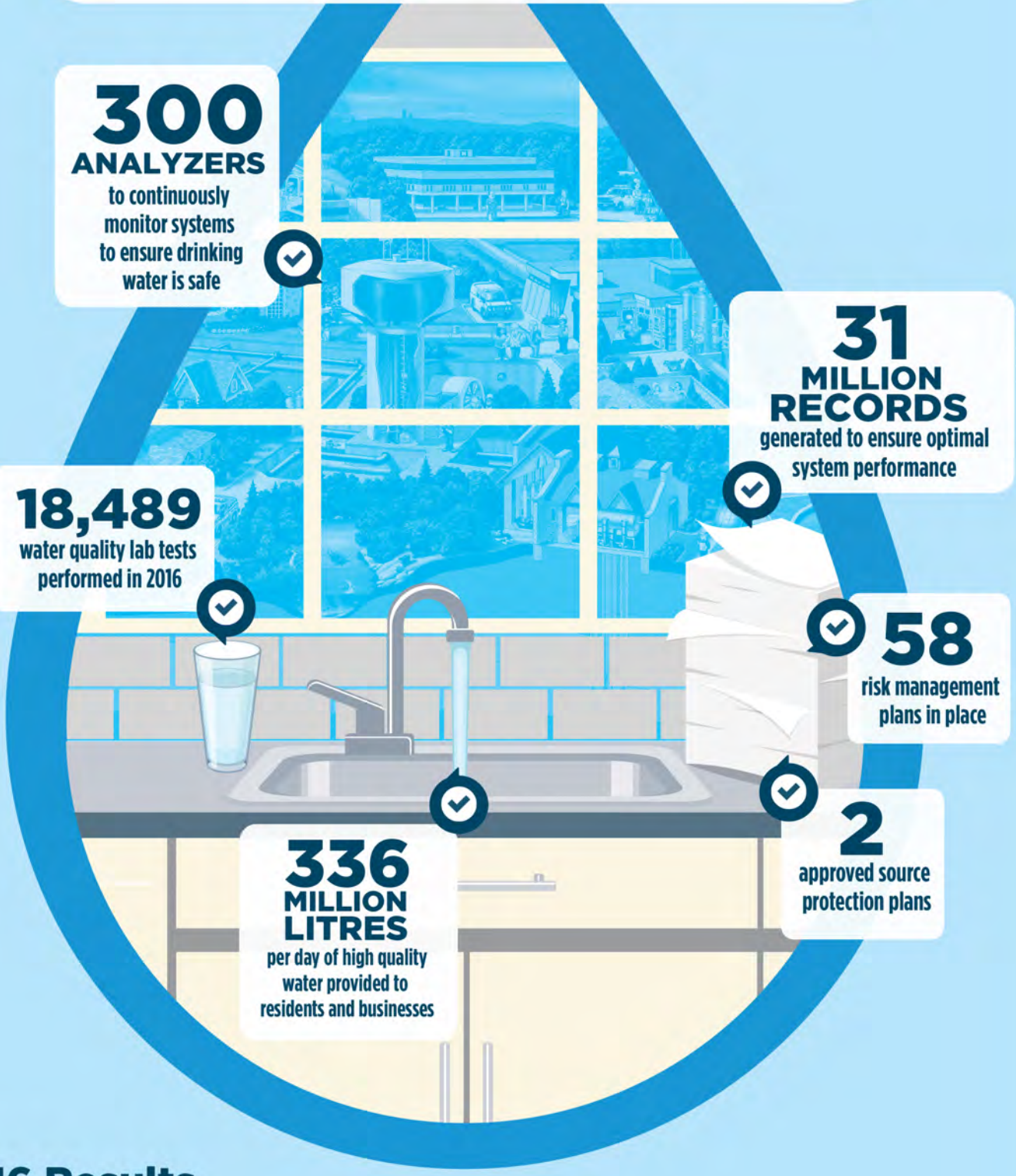
- Seven water resource recovery facilities and one lagoon system
- Partnership with Durham Region on ownership, use and management of the Duffin Creek Plant
- 21 sewage pumping stations
- Approximately 330 kilometres of sewer mains

York Region's three drinking water sources include:

- Groundwater drawn from Regional aquifers
- Surface water drawn from Lake Ontario (provided through agreements with the City of Toronto and the Regional Municipality of Peel (Peel Region))
- Surface water drawn from Lake Simcoe

This report summarizes quantities and flow rates of the drinking water supplied by York Region's drinking water systems during the 2016 calendar year as part of the Region's reporting requirements under the *Safe Drinking Water Act, 2002* (Safe Drinking Water Act).

# Keeping Our Drinking Water Safe



**300**
**ANALYZERS**
to continuously monitor systems to ensure drinking water is safe

**31**
**MILLION RECORDS**
generated to ensure optimal system performance

**18,489**
water quality lab tests performed in 2016

**58**
risk management plans in place

**336**
**MILLION LITRES**
per day of high quality water provided to residents and businesses

**2**
approved source protection plans

## 2016 Results

# Meeting and Exceeding Our Requirements

All Ontario municipal drinking water systems must report drinking water quality and quantity information under the Safe Drinking Water Act. An annual report to Council, including this summary report, along with water quality reports posted on york.ca/drinkingwater, fulfill the Region's annual regulatory reporting obligations.

York Region follows a "One Water" philosophy adopted by many industry leaders around the world, which recognizes that the same water is cycled throughout all uses on Earth and must be protected at all points in the water cycle. In addition, regulations require the Region to protect sources of municipal drinking water. Proactive risk management is carried out every day by:

- Following a multi-barrier approach to ensure drinking water is kept clean, safe and reliable
- Complying with legislation designed to protect public health through clean drinking water
- Planning and constructing infrastructure to meet the needs of the growing Region
- Preventing service interruptions by maintaining well systems for supplemental water capacity
- Driving innovation by hosting progressive research programs and securing strategic partnerships with industry and research leaders
- Completing thousands of tests and using highly sophisticated real-time monitoring to help ensure that drinking water meets quality standards
- Delivering comprehensive training programs, ensuring operators continue to achieve excellence in drinking water operations and are prepared for future challenges
- Maintaining an integrated management system to monitor compliance and drive continuous improvement, including the Drinking Water Quality Management Standard (DWQMS), ISO 9001 and ISO 14001

In 2016, all of York Region's Drinking Water Systems operated within the monthly average flow, maximum daily withdrawal and allowable daily withdrawal limits as set out in Permits to Take Water and Municipal Drinking Water Licenses issued by the Ministry of the Environment and Climate Change, as well as supply agreements for water purchased from the City of Toronto and Peel Region.

York Region uses continuous monitoring analyzers to keep track of critical processes and conducts a comprehensive sampling program that exceeds regulatory requirements. In 2016:

- 18,489 laboratory analyzed tests were performed on water quality samples, which resulted in 25 adverse results, meaning 99.87 per cent of all tests met the regulated standards.
- Approximately 31 million readings were recorded by 300 continuous monitoring analyzers for operating parameters such as disinfection, pressure, or turbidity. 89 of these system performance readings were reported as adverse events.

Adverse events are reported to the Ministry of the Environment and Climate Change and the Region's Medical Officer of Health, as required by the Safe Drinking Water Act. An adverse event does not necessarily indicate that drinking water is unsafe – it indicates a parameter has fallen outside the normal operating range and corrective action must be taken. None of the events that occurred in 2016 posed a threat to public health, and no additional corrective actions were directed by the Ministry of the Environment and Climate Change or the Region's Medical Officer of Health.

# Sources of York Region Drinking Water 2016

3% LAKE SIMCOE

7% YORK REGION GROUNDWATER

90% LAKE ONTARIO

30% PEEL REGION SUPPLY

60% CITY OF TORONTO SUPPLY

# York Region Drinking Water Performance Review 2016

TOTAL NUMBER OF TESTS 18,489

Microbiological Samples 8,272

Inorganic Samples 3,544

Organic Samples 6,673

99.87% OF ALL SAMPLES MET REGULATED STANDARDS

122 BILLION LITRES OF WATER DELIVERED

# Multi-Barrier Approach Helps Protect Drinking Water

York Region uses a multi-barrier approach to ensure safe operation of its drinking water systems. The multi-barrier approach is a key recommendation from the Walkerton Inquiry, which resulted in some of the strictest regulations in the world for protecting public health through drinking water. The multi-barrier approach is an internationally recognized system of procedures, processes and tools that create a series of barriers to prevent contamination and provide high-quality drinking water.

The multi-barrier approach protects water from source, to tap, and back to source. Barriers ensuring safe, clean drinking water can be classified into the four broad categories below:

### 1. Protecting the Source

- **Monitoring Area** – Staff regularly test the extensive network of groundwater monitoring stations to evaluate potential changes in water quality and quantity that may impact Region drinking water supplies.
- **Protecting Quality** – the Region works with its partner local municipalities and other Regional departments to protect vulnerable areas through land use restrictions, zoning bylaws, prohibiting significant activities as required under the *Clean Water Act, 2002*, and by establishing impact assessment and mitigation plans. Risk management plans also are negotiated with farmers and businesses, with inspections to assist compliance and monitor effectiveness. Source protection plans are maintained for South Georgian Bay Lake Simcoe and Credit Valley, Toronto and Central Lake Ontario.
- **Preserving Water Quantity** – Staff assess risk to groundwater reserves in response to population demand, reduced recharge (refilling) of aquifers due to development that encourages runoff, and drought due to inconsistent precipitation resulting from climate change.

### 2. Processes to Treat and Manage Water

- **Robust Water Treatment** – Helps ensure drinking water meets regulatory requirements on a continual basis, often using multiple steps to treat drinking water, eliminate potentially harmful organisms and provide safe, clean drinking water to our customers.
- **Secure Water Distribution Network** – Once water is treated, the Region works with its partner local municipalities to ensure water is distributed to customers in a manner which maintains quality all the way to the tap. York Region works actively with local municipalities, the City of Toronto and Peel Region to ensure the security and integrity of the distribution system.
- **Effective Wastewater Treatment** – Wastewater is collected and treated with enhanced treatment technologies and performance monitoring to remove contaminants before being returned to the environment. Partnerships with Durham Region and Peel Region provide economies of scale for wastewater treatment, and position York Region as an industry leader.

### 3. System Monitoring

- **Monitoring and Testing** – Ensuring water quality is maintained from source to tap by monitoring processes and water quality through sophisticated continuous monitoring and lab tests. York Region gathered 31 million continuous monitoring records and 18,489 lab test results in 2016 to help ensure drinking water is clean and safe.
- **Management and Oversight** – Administration of standards through an integrated management systems, which help maintain guidelines and standards through defined processes and performance monitoring.

# Multi-Barrier Approach - continued

### 4. Policy and Development:

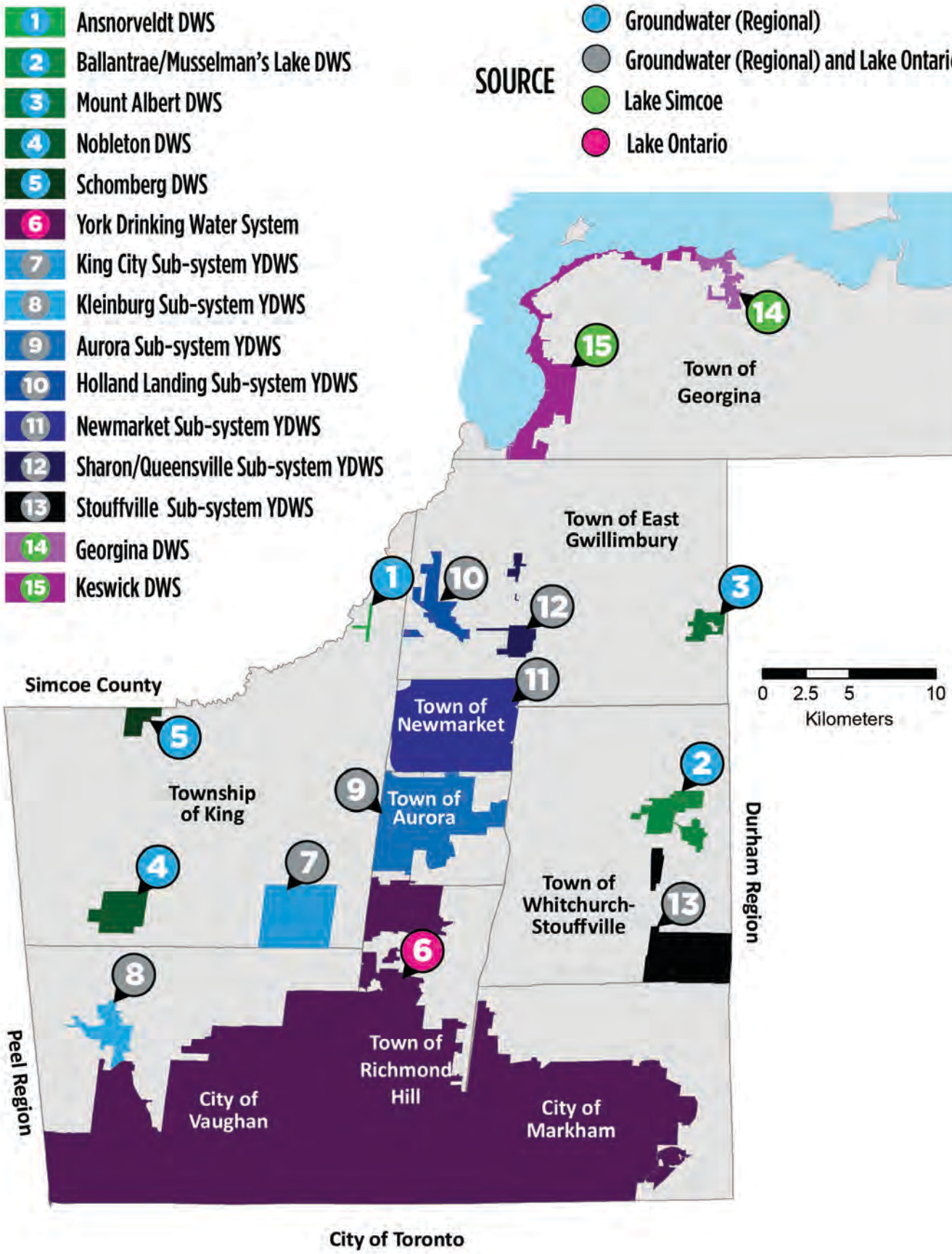
- **Public Awareness** – Education on how to protect sources of drinking water and encourage conservation. The Region promotes awareness in a number of ways, including educational campaigns and outreach activities. Visit york.ca/wateris for more information.
- **Legislative and Policy Frameworks** – Compliance with Provincial legislation and regulations that drinking water and wastewater are required to meet such as the Safe Drinking Water Act and the *Ontario Water Resources Act, 1990*. York Region also maintains interdepartmental and intermunicipal advocacy groups to help shape new or amended legislation.
- **Guidelines, Standards, and Objectives** – Tools that guide the operation of processes to treat and manage drinking water and wastewater. York Region is accredited under the Provincial Drinking Water Quality Management Standard and is also registered to ISO 9001 and ISO 14001.
- **Research, Science, and Technology** – Innovation in science to help better understand the quality of water and technology to improve processes that treat and manage water. York Region continues to optimize our treatment processes by collaborating with external government partners and university researchers.

# Summary of Communities supplied by York Region Drinking Water Systems

Table 1 – Communities served by Drinking Water Systems

| Drinking Water System (Source) | Local Community | Local Municipal Water Distributor | Page |
|---|---|---|---|
| Ansnorveldt Drinking Water System (Groundwater) | Ansnorveldt | Township of King | 12 |
| Ballantrae-Musselman's Lake Drinking Water System (Groundwater) | Ballantrae | Town of Whitchurch-Stouffville | 14 |
| | Musselman's Lake | Town of Whitchurch- Stouffville | 14 |
| Mount Albert Drinking Water System (Groundwater) | Mount Albert | Town of East Gwillimbury | 16 |
| Nobleton Drinking Water System (Groundwater) | Nobleton | Township of King | 18 |
| Schomberg Drinking Water System (Groundwater) | Schomberg | Township of King | 20 |
| York Drinking Water System (Lake Ontario only) | Maple | City of Vaughan | 22 |
| | Markham | City of Markham | 22 |
| | Richmond Hill | Town of Richmond Hill | 22 |
| | Vaughan | City of Vaughan | 22 |
| | Woodbridge | City of Vaughan | 22 |
| York Drinking Water System (Lake Ontario & Groundwater) | Aurora | Town of Aurora | 24 |
| | Holland Landing | Town of East Gwillimbury | 26 |
| | King City | King Township | 28 |
| | Kleinburg | City of Vaughan | 30 |
| | Newmarket | Town of Newmarket | 32 |
| | Queensville | Town of East Gwillimbury | 34 |
| | Sharon | Town of East Gwillimbury | 34 |
| | Stouffville | Town of Whitchurch-Stouffville | 36 |
| Georgina Drinking Water System (Lake Simcoe) | Keswick | Town of Georgina | 40 |
| | Sutton | Town of Georgina | 38 |

# York Region Drinking Water Systems (DWS)



# Ansnorveldt

## Drinking Water System

Groundwater Supply

| Chlorine | Ultraviolet Disinfection | Enhanced Treatment | Sodium Silicate | Filtration |

Ansnorveldt is located in northeastern King Township within the Holland Marsh. The residential community served by the Ansnorveldt Drinking Water System is centred around Dufferin Street, north of Highway 9. York Region manages the water supply of two wells and one pumping station. The Township of King maintains and distributes water to consumers from the Regional Supply.

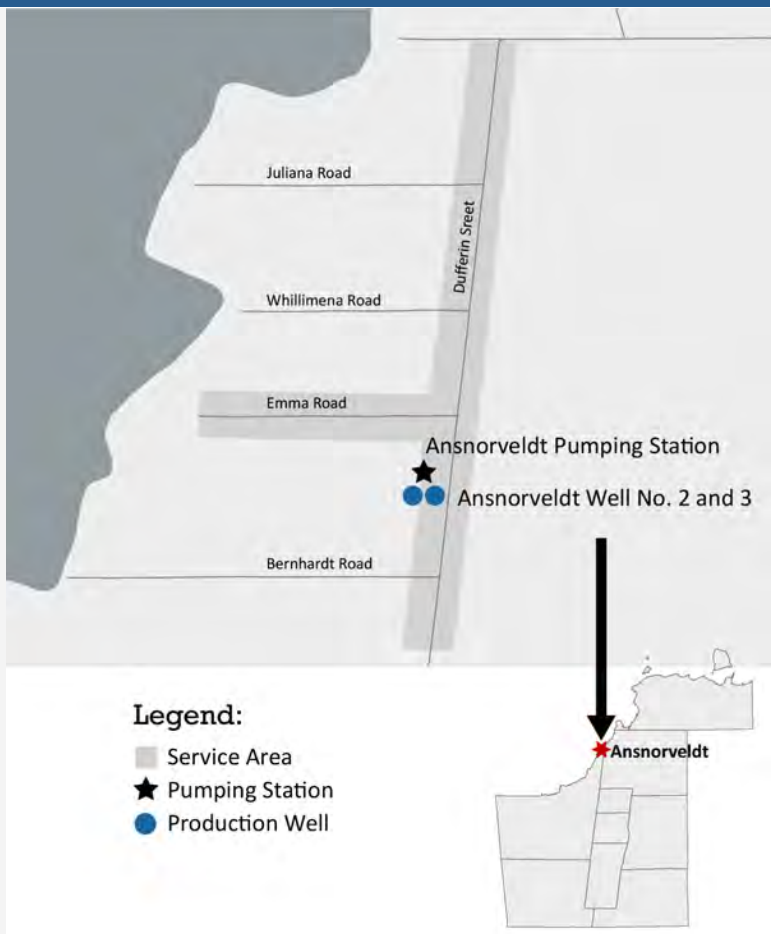
**Raw Water Source Description**

Water taking is regulated by a Permit to Take Water issued by the Ministry of the Environment and Climate Change. Two wells extract groundwater from a deep aquifer. Iron, manganese and hardness levels are naturally elevated, which is common in deep aquifers across York Region. Staff use raw water test results to monitor the health of the aquifer and determine the best water treatment.

**Water Treatment and Supply**

The two wells are located in one pumphouse. Water is disinfected with chlorine (sodium hypochlorite). No other treatments are applied. Water from the wells blends with the disinfectant, and is pumped to two small, on site storage facilities. Pumps deliver the treated water to the local distribution system.

In addition to routine water testing and facility inspections by Operators, online analyzers continuously monitor the treatment and delivery processes. These analyzers trigger alarms and automatically shut down and lockout pumps to notify Operators when immediate attention is needed on site.




### Summary of Approvals and Permits

**Municipal Drinking Water Licence Number**: 013 108
Issue Date: January 27, 2015
Expiry Date: January 26, 2020

**Drinking Water Works Permit Number**: 013 208
Issue Date: January 27, 2015

**Permit to Take Water Number**: 8037 94XPXR
Issue Date: March 15, 2013
Expiry Date: December 31, 2021

**Operational Plan Number**: 013 408

**Financial Plan Number**: 013 308A

**MOECC Waterworks Number**: 260002213

# Ansnorveldt Drinking Water System Performance Summary

| 2016 Treated Water Tests | Hardness | Sodium | Fluoride | Chlorine | E. coli | Total Coliforms |
|---|---|---|---|---|---|---|
| Average Results | 112 mg/L | 41 mg/L | 0.25 mg/L | 1.58 mg/L | Not Detected | Not Detected |

## Permitted and Actual Maximum Daily Withdrawal from the Ansnorveldt Production Wells for January 1 to December 31, 2016

| Location | Permitted Daily Withdrawal (litres) | Actual Maximum Daily Withdrawal (litres) | Days Operating at Peak Capacity (May to October) | Number of Days Operating at Peak Capacity (Annual) |
|---|---|---|---|---|
| Well 2 | 184,320 | 85,141<br>July 5, 2016 | 0 | 0 |
| Well 3 | 115,200 | 48,227<br>July 5, 2016 | 0 | 0 |

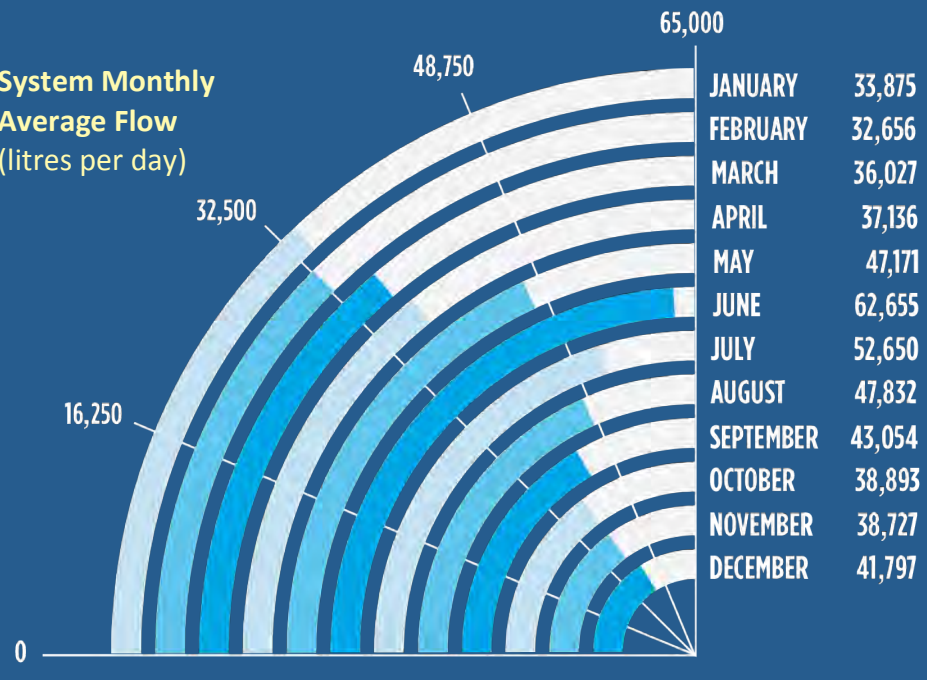
### Withdrawal from the Ansnorveldt Production Wells Jan. 1 to Dec. 31, 2016

Actual Annual Withdrawal
15,639,777 litres

Annual Permitted Withdrawal
109,324,800 litres

Percentage of Permitted Annual Withdrawal
14 per cent

### System Monthly Average Flow
(litres per day)



# Ballantrae-Musselman's Lake
## Drinking Water System

Groundwater Supply

| Chlorine | Ultraviolet Disinfection | Enhanced Treatment | Sodium Silicate | Filtration |

Ballantrae and Musselman's Lake are located within the Town of Whitchurch-Stouffville, centred on Aurora Road around Highway 48 and Ninth Line. York Region manages the water supply of three wells and one elevated storage tank. The Town of Whitchurch-Stouffville maintains and distributes the water to consumers from the Regional Supply.

**Raw Water Source Description**

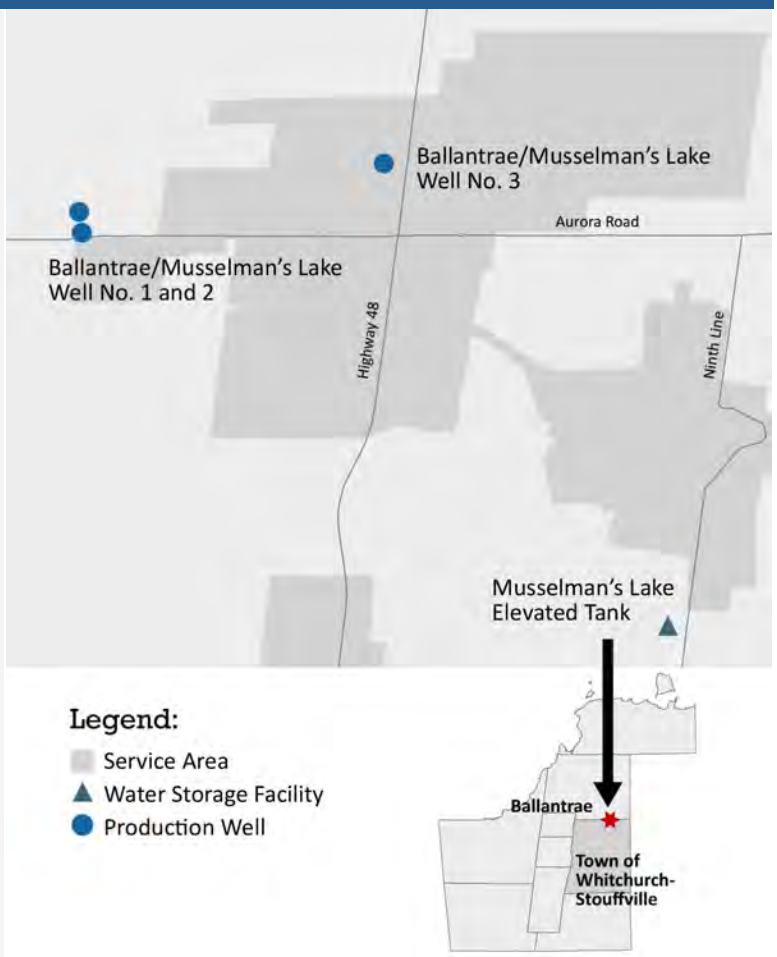
Water taking is regulated by a Permit to Take Water (PTTW) issued by the Ministry of the Environment and Climate Change. The PTTW for Ballantrae-Musselman's Lake expired in March 2016. The Region is helping the Ministry assess water table levels in the area by providing monitoring data. The Ministry has instructed the Region to follow the conditions of the expired permit until the assessment is complete, at which point a new PTTW will be issued.

Three wells extract groundwater from a deep aquifer. Iron, manganese and hardness levels are naturally elevated, which is common in deep aquifers across York Region. Staff use raw water test results to monitor the health of the aquifer and determine the best water treatment.

**Water Treatment and Supply**

Disinfection is maintained with chlorine. Wells 1 and 2 are disinfected with sodium hypochlorite. Water from Well 3 is disinfected with chlorine gas. Sodium silicate is added to manage iron and manganese in the distribution system. The storage facility holds water for peak demand use, and maintains pressure in the system.

In addition to routine water testing and facility inspections by Operators, online analyzers continuously monitor the treatment and delivery processes. These analyzers trigger alarms and automatically shut down and lockout pumps to notify Operators when immediate attention is needed on site.




### Summary of Approvals and Permits

**Municipal Drinking Water Licence Number**: 013 106
Issue Date: January 27, 2015
Expiry Date: January 26, 2020

**Drinking Water Works Permit Number**: 013 206
Issue Date: January 27, 2015

**Permit to Take Water Number**: 2030 8KDJCG
Issue Date: August 3, 2011
Expiry Date: March 31, 2016

**Operational Plan Number**: 013 406

**Financial Plan Number**: 013 301A

**MOECC Waterworks Number**: 220008658

# Ballantrae-Musselman's Lake Drinking Water System Performance

| 2016 Treated Water Tests | Hardness | Sodium | Fluoride | Chlorine | E. coli | Total Coliforms |
|---|---|---|---|---|---|---|
| Average Results | 174 mg/L | 9 mg/L | 0.08 mg/L | 1.58 mg/L | Not Detected | Not Detected |

## Permitted and Actual Maximum Daily Withdrawal from the Ballantrae-Musselman's Lake Production Wells for January 1 to December 31, 2016

| Location | Permitted Daily Withdrawal (litres) | Actual Maximum Daily Withdrawal (litres) | Days Operating at Peak Capacity (May to October) | Number of Days Operating at Peak Capacity (Annual) |
|---|---|---|---|---|
| Well 1 | 2,617,920 | 1,562,758<br>August 27, 2016 | 0 | 0 |
| Well 2 | 2,617,920 | 1,818,406<br>July 23, 2016 | 0 | 0 |
| Well 3 | 2,617,920 | 2,046,750<br>June 16, 2016 | 0 | 0 |
| Wells<br>1 + 2 + 3 | 4,580,000 | 3,640,000<br>July 23, 2016 | 0 | 0 |

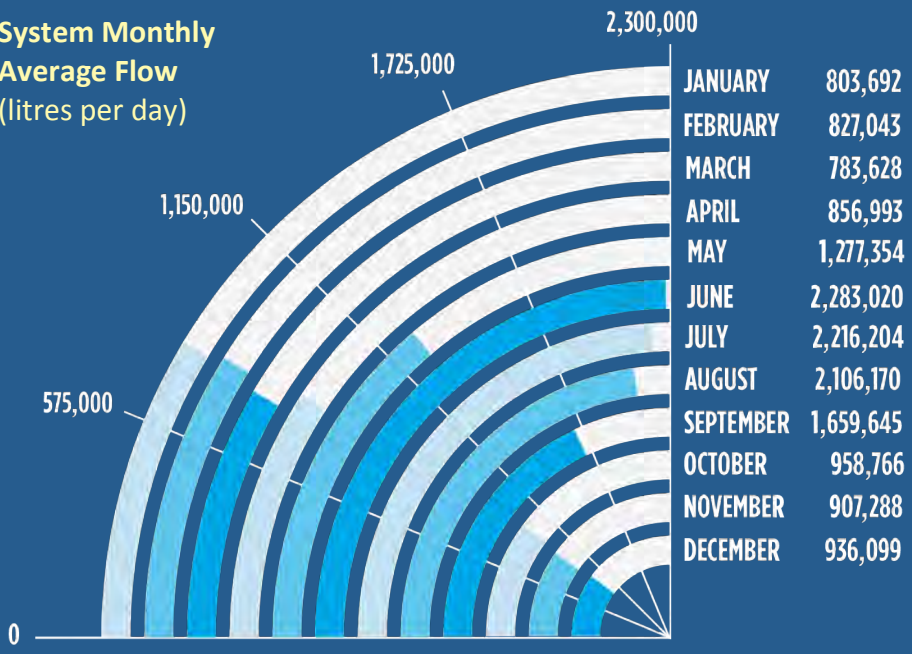
**Withdrawal from the Ballantrae-Musselman's Lake Production Wells Jan. 1 to Dec. 31, 2016**

Actual Annual Withdrawal
476,731,877 litres

Annual Permitted Withdrawal
1,671,700,000 litres

Percentage of Permitted Annual Withdrawal
29 per cent

**System Monthly Average Flow**
(litres per day)



# Mount Albert

## Drinking Water System

Groundwater Supply

| Chlorine | Ultraviolet Disinfection | Enhanced Treatment | Sodium Silicate | Filtration |

Mount Albert is located within the Town of East Gwillimbury around Mount Albert Road between Highway 48 and York Durham Line. York Region manages the water supply of three wells and two elevated storage tanks. The Town of East Gwillimbury maintains and distributes the water to consumers from the Regional Supply.

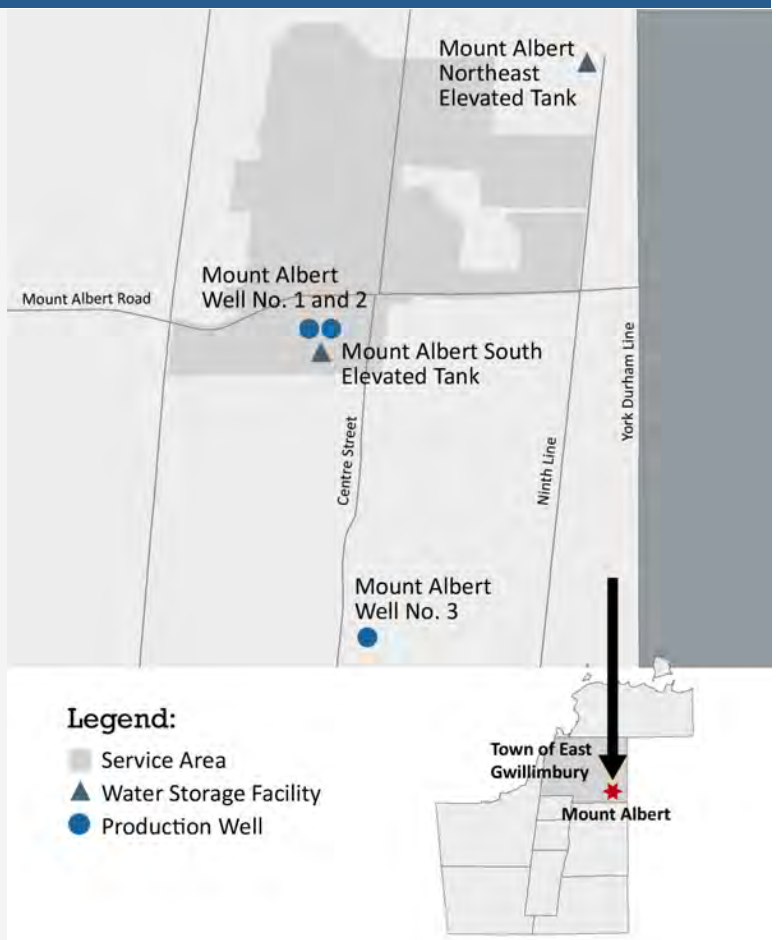
**Raw Water Source Description**

Water taking is regulated by a Permit to Take Water issued by the Ministry of the Environment and Climate Change. Three wells extract groundwater from a deep aquifer. Iron, manganese and hardness levels are naturally elevated, which is common in deep aquifers across York Region. Staff use raw water test results to monitor the health of the aquifer and determine the best water treatment.

**Water Treatment and Supply**

Disinfection is maintained with chlorine. Water from Wells 1 and 2 are disinfected with sodium hypochlorite. Water from Well 3 is disinfected with chlorine gas. Sodium silicate is added to manage iron and manganese in the distribution system. The storage facilities hold water for peak demand use, and maintain pressure in the system.

In addition to routine water testing and facility inspections by Operators, online analyzers continuously monitor the treatment and delivery processes. These analyzers trigger alarms and automatically shut down and lockout pumps to notify Operators when immediate attention is needed on site.




### Summary of Approvals and Permits

**Municipal Drinking Water Licence Number**: 013 103
Issue Date: January 27, 2015
Expiry Date: January 26, 2020

**Drinking Water Works Permit Number**: 013 203
Issue Date: January 27, 2015

**Permit to Take Water Number**: 0050 7FCMMY
Issue Date: June 9, 2008
Expiry Date: March 31, 2018

**Operational Plan Number**: 013 403

**Financial Plan Number**: 013 301A

**MOECC Waterworks Number**: 220006543

# Mount Albert Drinking Water System Performance Summary

| 2016 Treated Water Tests | Hardness | Sodium | Fluoride | Chlorine | E. coli | Total Coliforms |
|---|---|---|---|---|---|---|
| Average Results | 302 mg/L | 10 mg/L | 0.06 mg/L | 1.54 mg/L | Not Detected | Not Detected |

## Permitted and Actual Maximum Daily Withdrawal from the Mount Albert Production Wells for January 1 to December 31, 2016

| Location | Permitted Daily Withdrawal (litres) | Actual Maximum Daily Withdrawal (litres) | Days Operating at Peak Capacity (May to October) | Number of Days Operating at Peak Capacity (Annual) |
|---|---|---|---|---|
| Well 1 | 3,273,120 | 2,308,563 October 29, 2016 | 0 | 0 |
| Well 2 | 3,273,120 | 1,898,836 October 6, 2016 | 0 | 0 |
| Well 3 | 3,273,120 | 1,522,875 July 4, 2016 | 0 | 0 |
| Wells 1 + 2 + 3 | 4,990,000 | 2,557,700 July 6, 2016 | 0 | 0 |

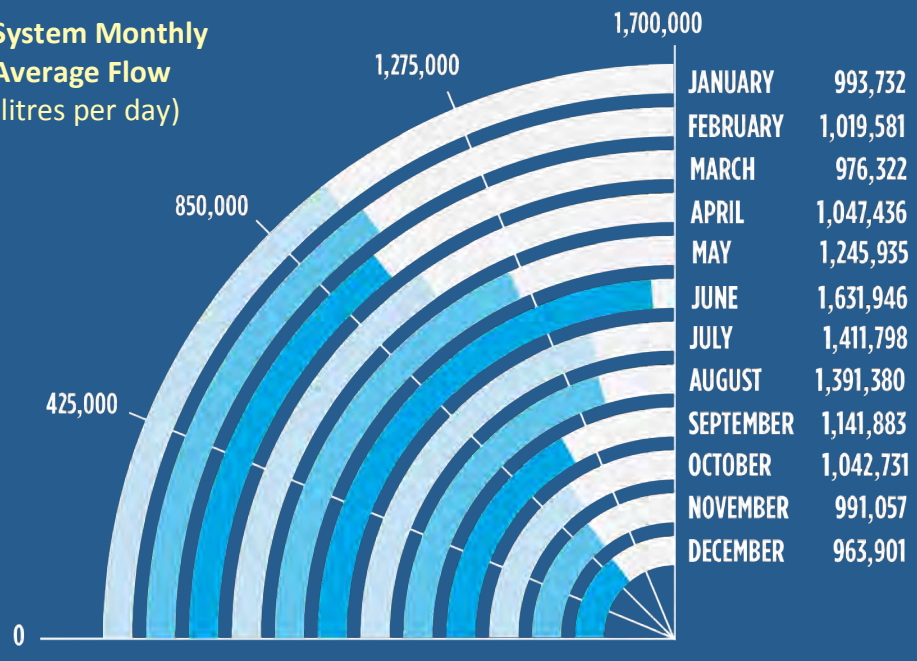
**Withdrawal from the Mount Albert Production Wells Jan. 1 to Dec. 31, 2016**

Actual Annual Withdrawal
422,737,269 litres

Annual Permitted Withdrawal
1,821,350,000 litres

Percentage of Permitted Annual Withdrawal
23 per cent

**System Monthly Average Flow**
(litres per day)



# Nobleton

## Drinking Water System

Groundwater Supply

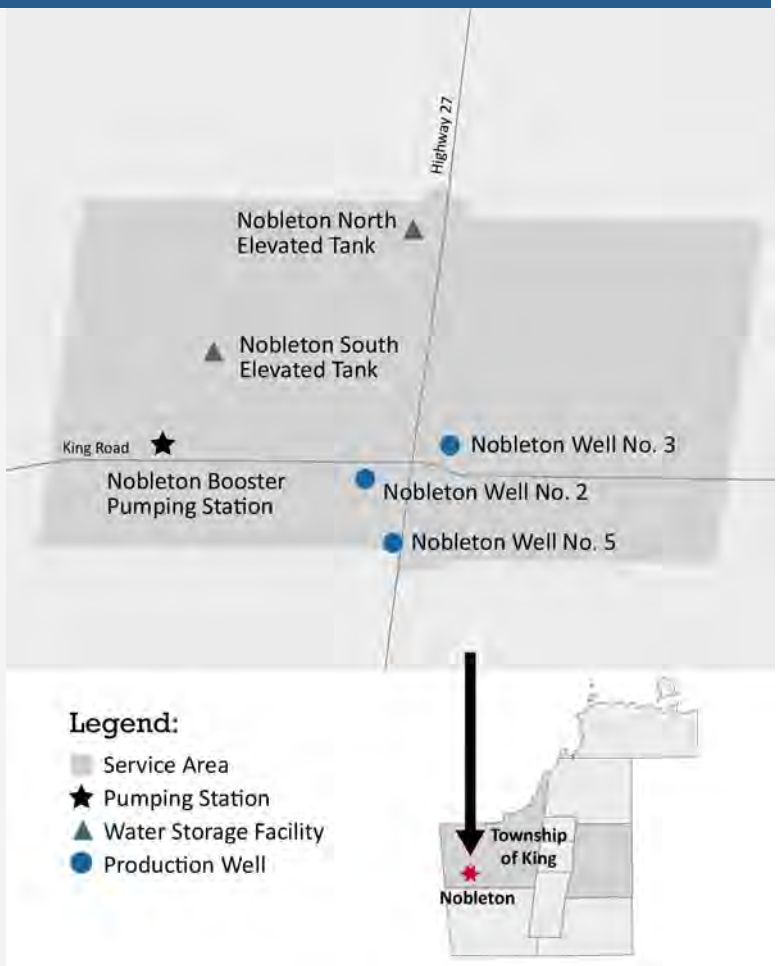
| Chlorine | Ultraviolet Disinfection | Enhanced Treatment | Sodium Silicate | Filtration |

Nobleton is located within the Township of King around King Road and Highway 27. York Region manages the water supply of three wells, one booster pumping station and two elevated storage tanks. The Township of King maintains and distributes the water to consumers from the Regional Supply.

**Raw Water Source Description**
Water taking is regulated by a Permit to Take Water issued by the Ministry of the Environment and Climate Change. Three wells extract groundwater from a deep aquifer. Iron, manganese and hardness levels are naturally elevated, which is common in deep aquifers across York Region. Staff use raw water test results to monitor the health of the aquifer and determine the best water treatment.

**Water Treatment and Supply**
Disinfection is maintained with chlorine. Water from Wells 2 and 5 are disinfected with chlorine gas. Water from Well 3 is disinfected with sodium hypochlorite. Sodium silicate is added at all wells to manage iron and manganese in the distribution system. The storage facilities hold water for peak demand use and maintain pressure in the system. The booster pumping station also maintains pressure.

In addition to routine water testing and facility inspections by Operators, online analyzers continuously monitor the treatment and delivery processes. These analyzers trigger alarms and automatically shut down and lockout pumps to notify Operators when immediate attention is needed on site.




### Summary of Approvals and Permits

**Municipal Drinking Water Licence Number**: 013 105
Issue Date: July 3, 2015
Expiry Date: January 26, 2020

**Drinking Water Works Permit Number**: 013 205
Issue Date: July 3, 2015

**Permit to Take Water Number**: 0550 9PPRJ9
Issue Date: October 14, 2014
Expiry Date: December 31, 2019

**Operational Plan Number**: 013 405

**Financial Plan Number**: 013 301A

**MOECC Waterworks Number**: 220002306

# Nobleton Drinking Water System Performance Summary

| 2016 Treated Water Tests | Hardness | Sodium | Fluoride | Chlorine | E. coli | Total Coliforms |
|---|---|---|---|---|---|---|
| Average Results | 254 mg/L | 20 mg/L | 0.13 mg/L | 1.63 mg/L | Not Detected | Not Detected |

## Permitted and Actual Maximum Daily Withdrawal from the Nobleton Production Wells for January 1 to December 31, 2016

| Location | Permitted Daily Withdrawal (litres) | Actual Maximum Daily Withdrawal (litres) | Days Operating at Peak Capacity (May to October) | Number of Days Operating at Peak Capacity (Annual) |
|---|---|---|---|---|
| Well 2 | 1,964,000 | 1,553,875 November 8, 2016 | 0 | 0 |
| Well 3 | 2,496,000 | 2,326,375 August 30, 2016 | 7 | 8 |
| Well 5 | 2,496,000 | 2,374,469 July 29, 2016 | 23 | 32 |
| Wells 2 + 3 + 5 | 4,460,000 | 4,433,100 July 5, 2016 | 22 | 22 |

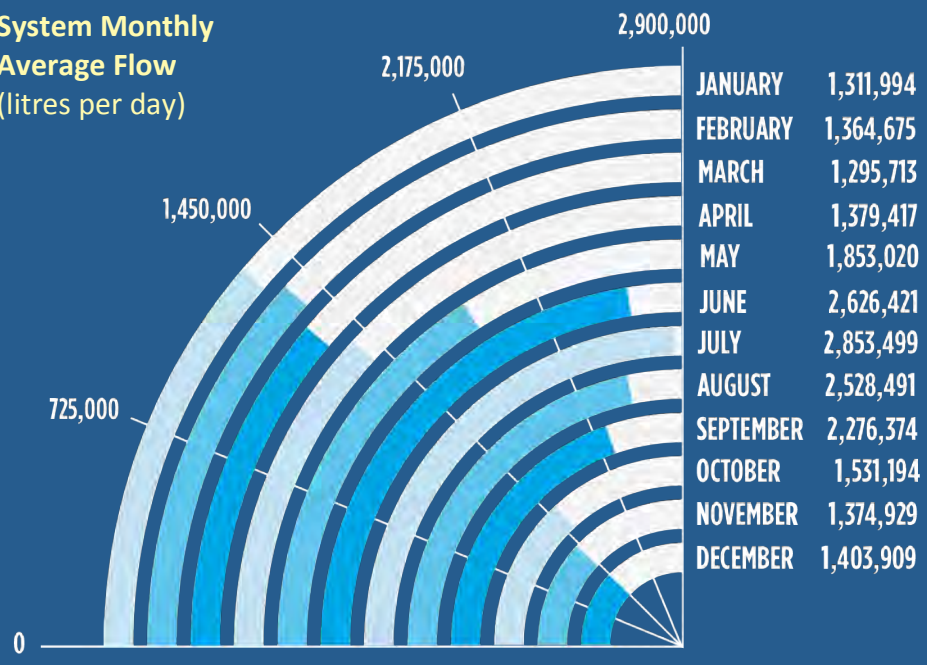
## Withdrawal from the Nobleton Production Wells Jan. 1 to Dec. 31, 2016

Actual Annual Withdrawal
665,402,219 litres

Annual Permitted Withdrawal
1,627,900,000 litres

Percentage of Permitted Annual Withdrawal
41 per cent

## System Monthly Average Flow
(litres per day)



# Schomberg

## Drinking Water System

Groundwater Supply

| Chlorine | Ultraviolet Disinfection | Enhanced Treatment | Sodium Silicate | Filtration |

Schomberg is located within the Township of King around the intersections of Highway 27 and Highway 9, just south of the border with Simcoe County. York Region manages the water supply of three wells, one treatment plant and one elevated storage tank. The Township of King maintains and distributes water to consumers from the Regional Supply.

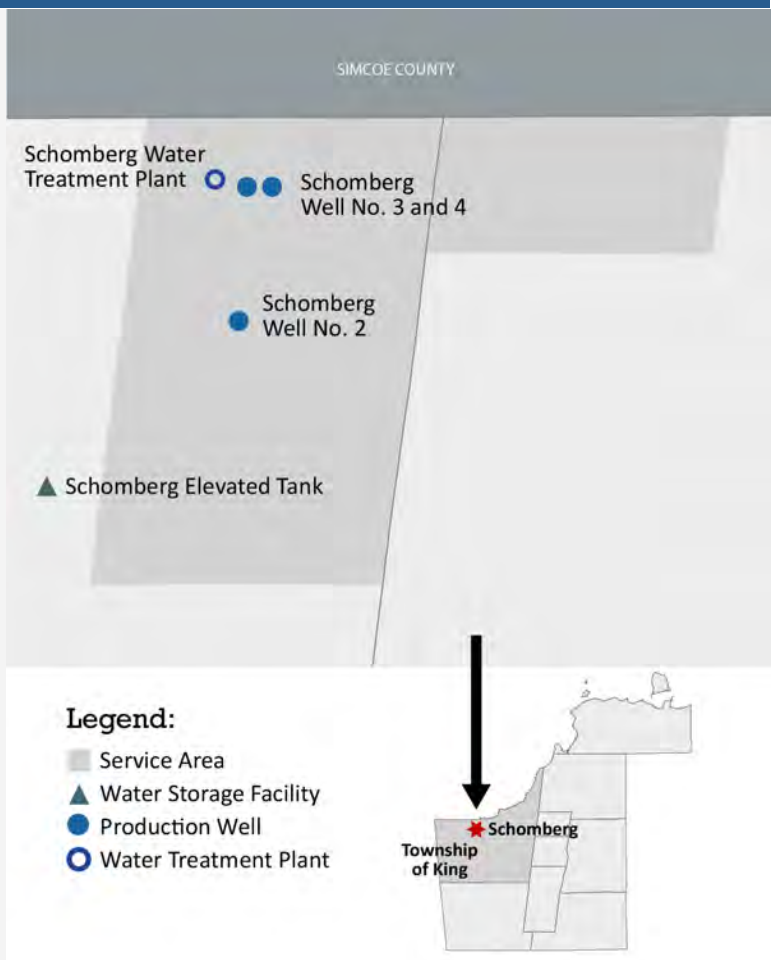
**Raw Water Source Description**

Water taking is regulated by a Permit to Take Water issued by the Ministry of the Environment and Climate Change. Three wells extract groundwater from a deep aquifer. Iron, manganese and hardness levels are naturally elevated, which is common in deep aquifers across York Region. Naturally occurring methane and ammonia are managed at the water treatment plant. Staff use raw water test results to monitor the health of the aquifer and determine the best water treatment.

**Water Treatment and Supply**

Water from the wells is pumped to an enhanced technology water treatment plant. Methane is stripped from the source water, and potassium permanganate removes iron and manganese before filtration. Filtration removes remaining odours and impurities. Water is disinfected with ultraviolet light and chlorine gas. Naturally occurring ammonia combines with the chlorine to form chloramine, which maintains disinfection in the distribution system. The storage facility holds water for peak demand use, and maintains pressure in the system.

In addition to routine water testing and facility inspections by Operators, online analyzers continuously monitor the treatment and delivery processes. These analyzers trigger alarms and automatically shut down and lockout pumps to notify Operators when immediate attention is needed on site.




### Summary of Approvals and Permits

**Municipal Drinking Water Licence Number**: 013 110
Issue Date: January 27, 2015
Expiry Date: January 26, 2020

**Drinking Water Works Permit Number**: 013 210
Issue Date: January 27, 2015

**Permit to Take Water Number**: 0706 7E8T5G
Issue Date: June 3, 2008
Expiry Date: April 30, 2018

**Operational Plan Number**: 013 410

**Financial Plan Number**: 013 301A

**MOECC Waterworks Number**: 220004901

# Schomberg Drinking Water System Performance Summary

| 2016 Treated Water Tests | Hardness | Sodium | Fluoride | Chlorine | E. coli | Total Coliforms |
|---|---|---|---|---|---|---|
| Average Results | 283 mg/L | 19 mg/L | 0.14 mg/L | 2.47 mg/L | Not Detected | Not Detected |

## Permitted and Actual Maximum Daily Withdrawal from the Schomberg Production Wells for January 1 to December 31, 2016

| Location | Permitted Daily Withdrawal (litres) | Actual Maximum Daily Withdrawal (litres) | Days Operating at Peak Capacity (May to October) | Number of Days Operating at Peak Capacity (Annual) |
|---|---|---|---|---|
| Well 2 | 1,636,560 | 23,629<br>March 14, 2016 | 0 | 0 |
| Well 3 | 2,290,000 | 1,865,000<br>May 22, 2016 | 1 | 1 |
| Well 4 | 1,507,680 | 1,296,000<br>September 6, 2016 | 35 | 45 |

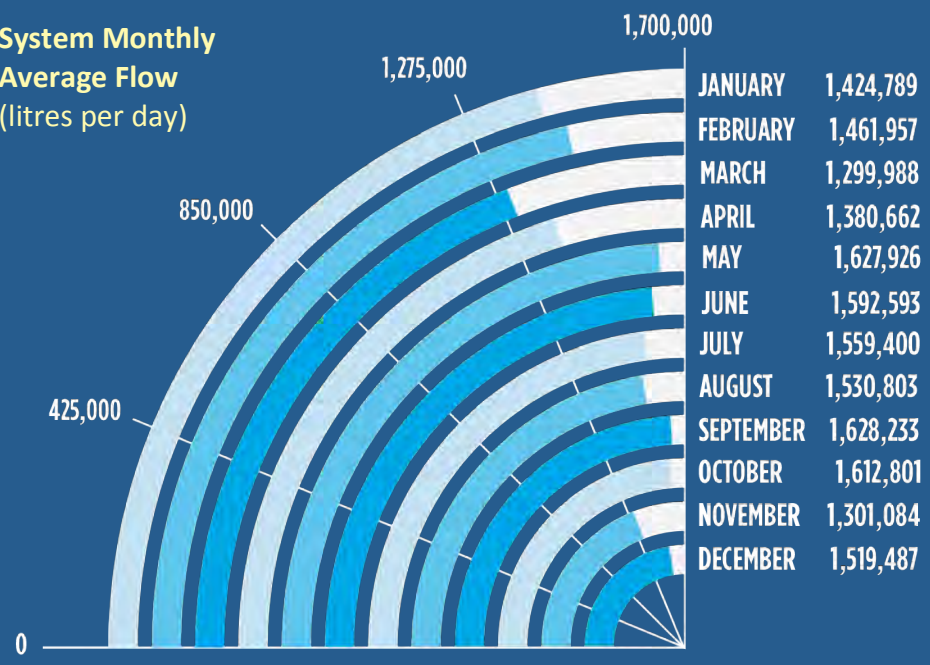
**Withdrawal from the Schomberg Production Wells Jan. 1 to Dec. 31, 2016**

Actual Annual Withdrawal
547,304,983 litres

Annual Permitted Withdrawal
1,983,497,600 litres

Percentage of Permitted Annual Withdrawal
28 per cent

**System Monthly Average Flow**
(litres per day)



# York
## Drinking Water System

Surface Water, Lake Ontario Supply

The Town of Richmond Hill and the Cities of Vaughan and Markham form the southern border of York Region. These three municipalities receive all their water from Lake Ontario through the York Drinking Water System (York DWS). In these areas, initial treatment on the source water is done by Peel Region and the City of Toronto. In the communities north of Vaughan, Richmond Hill and Markham that receive water from the York DWS, the supply is supplemented with groundwater from wells.

There are seven subsystems connected to the York DWS that are supplemented with York Region groundwater. Each of these subsystems has their own summary in this report. The King City and Kleinburg subsystems have groundwater wells maintained for backup supply, however in 2016 they received all of their drinking water from the York DWS.

The York Drinking Water System consists of 8 pumping stations, 5 elevated storage tanks, and 7 underground storage reservoirs to maintain pressure and transmit this water from the suppliers to the local municipalities. The City of Vaughan, the Town of Richmond Hill and the City of Markham distribute the water to consumers from Regional Supply.

**Raw Water Source Description**
Lake Ontario water is treated by the City of Toronto or Peel Region and is supplied to York Region's transmission system. No further treatment is applied to the southern York DWS.

In addition to routine water testing and facility inspections by Operators, online analyzers continuously monitor the treatment and delivery processes. These analyzers trigger alarms and automatically shut down and lockout pumps to notify Operators when immediate attention is needed on site.

**Toronto Water Supplied to York Region**
The Toronto/York Water Supply Agreement governs water supplied by the City of Toronto to York Region. The maximum volume allowed is 503,000,000 litres per day. In 2016, the average daily volume provided to York Region was 199,029,326 litres per day.

**Peel Water Supplied to York Region**
The York/Peel Water Supply Agreement governs water supplied by Peel Region to York Region. The maximum volume allowed is 179,430,000 litres per day. In 2016, the average daily volume provided to York Region was 101,791,490 litres per day.

**Accommodating Future Growth**
York Region receives volumes below the maximum quantities permitted under these agreements. Maximum permitted volumes have been set to allow for annual increases required to service forecasted population growth to 2041.


### Summary of Approvals and Permits

**Municipal Drinking Water Licence Number**: 013 101
Issue Date: October 26, 2016
Expiry Date: January 26, 2020

**Drinking Water Works Permit Number**: 013 201
Issue Date: June 11, 2015

**Operational Plan Number**: 013 401

**Financial Plan Number**: 013 301A

**MOECC Waterworks Number**: 260001929

# York Drinking Water System Performance Summary

Individual subsystem summaries are found on pages 24 - 38

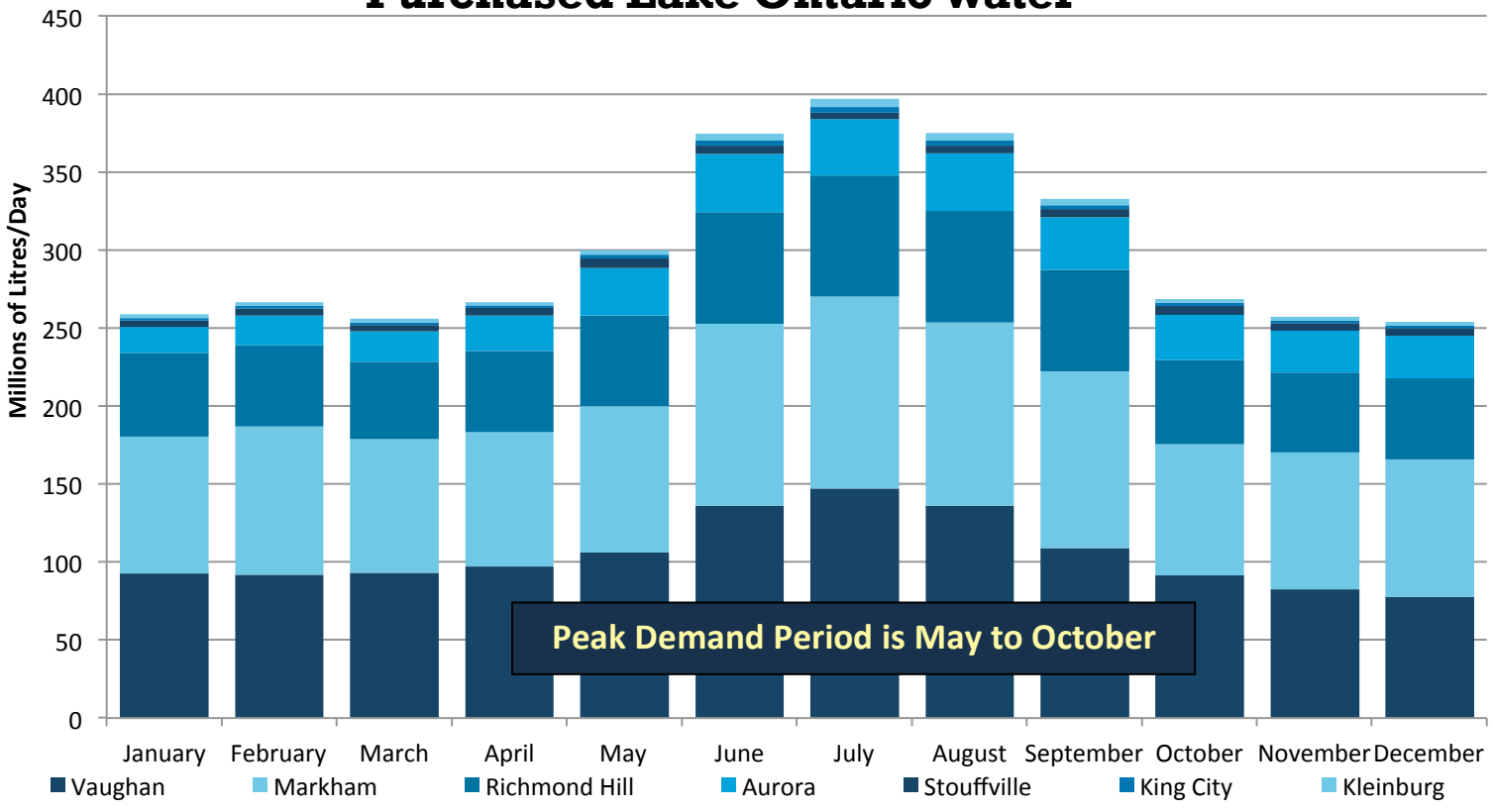
| 2016 Treated Water Tests | Hardness | Sodium | Fluoride | Chlorine | E. coli | Total Coliforms |
|---|---|---|---|---|---|---|
| Vaughan Average Results | 128 mg/L | 21 mg/L | 0.30 mg/L | 1.03 mg/L | Not Detected | Not Detected |
| Richmond Hill Average Results | 128 mg/L | 21 mg/L | 0.46 mg/L | 1.36 mg/L | Not Detected | Not Detected |
| Markham Average Results | 125 mg/L | 15 mg/L | 0.50 mg/L | 1.35 mg/L | Not Detected | Not Detected |

**Water consumption supplied through agreements with the City of Toronto and Peel Region (litres per day)**

| | Supply from the City of Toronto | Supply from Peel Region |
|---|---|---|
| Average Daily Consumption (litres per day) | 199,029,326 | 101,791,490 |
| Daily Permitted Consumption (litres per day) | 503,000,000 | 179,430,000 |

## Total Permitted Consumption (Toronto and Peel Combined) = 682,430,000 litres per day

## 2016 York DWS Monthly Average Consumption of Purchased Lake Ontario Water



# Aurora
## Drinking Water System

**York Drinking Water Sub-System:** Groundwater, Surface Water – Lake Ontario Blended Supply

| Chlorine | Ultraviolet Disinfection | Enhanced Treatment | Sodium Silicate | Filtration |

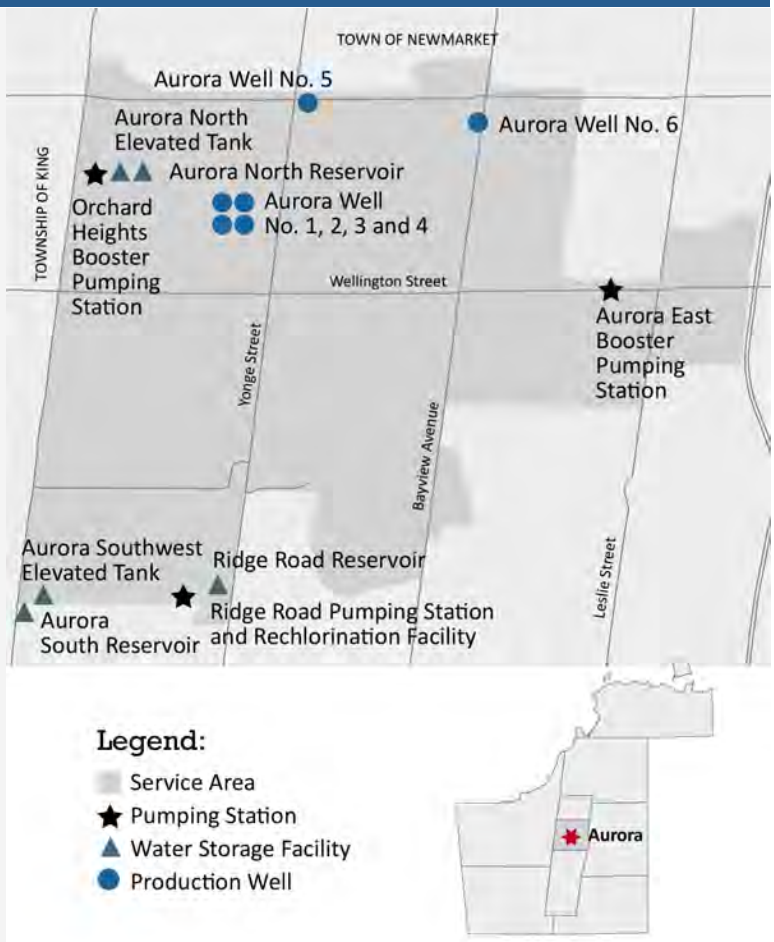
The Town of Aurora is located in the centre of York Region, bound by Bathurst Street, Bloomington Road, Highway 404 and just north of St. John's Sideroad. York Region manages the water supply of six wells, two elevated storage tanks, three underground storage reservoirs, and three booster pumping stations. Lake Ontario water is also supplied from the south by the York Drinking Water System (York DWS). The Town of Aurora maintains and distributes the water to consumers from the Regional Supply.

The Aurora Drinking Water System is part of an interconnecting system between Aurora, Holland Landing, Queensville, Newmarket and the larger York DWS. Connection to the York DWS reduces demand on the aquifer and provides a secure secondary source of drinking water.

**Raw Water Source Description**
Groundwater taking is regulated by a Permit to Take Water issued by the Ministry of the Environment and Climate Change. The City of Toronto and Peel Region have permits for taking Lake Ontario water. Supply agreements govern the purchase of water from the City of Toronto and Peel Region. Six wells extract groundwater from a deep aquifer. Iron, manganese and hardness levels are naturally elevated, which is common in deep aquifers across York Region. Staff use raw water test results to monitor the health of the aquifer and determine the best water treatment.

**Water Treatment and Supply**
Disinfection is maintained with chlorine and ammonia (chloramine). Sodium silicate is added to manage iron and manganese in the distribution system. The storage facilities hold water for peak demand use, and maintain pressure in the system. Three booster pumping stations also maintain pressure.

In addition to routine water testing and facility inspections by Operators, online analyzers continuously monitor the treatment and delivery processes. These analyzers trigger alarms and automatically shut down and lockout pumps to notify Operators when immediate attention is needed on site.




### Summary of Approvals and Permits

**Municipal Drinking Water Licence Number**: 013 101
Issue Date: October 26, 2016
Expiry Date: January 26, 2020

**Drinking Water Works Permit Number**: 013 201
Issue Date: June 11, 2015

**Permit to Take Water Number**: 6728 9NLQ2F
Issue Date: September 12, 2014
Expiry Date: December 31, 2023

**Operational Plan Number**: 013 401

**Financial Plan Number**: 013 301A

**MOECC Waterworks Number**: 220002440

# Aurora Drinking Water System Performance Summary

| 2016 Treated Water Tests | Hardness | Sodium | Fluoride | Chlorine | E. coli | Total Coliforms |
|---|---|---|---|---|---|---|
| Average Results | 133 mg/L | 22 mg/L | 0.46 mg/L | 2.33 mg/L | Not Detected | Not Detected |

## Permitted and Actual Maximum Daily Withdrawal from the Aurora Production Wells for January 1 to December 31, 2015

| Location | Permitted Daily Withdrawal (litres) | Actual Maximum Daily Withdrawal (litres) | Days Operating at Peak Capacity (May to October) | Number of Days Operating at Peak Capacity (Annual) |
|---|---|---|---|---|
| Well 1 | 3,273,120 | 3,145,000 June 30, 2016 | 41 | 50 |
| Well 2 | 5,891,760 | 5,183,000 June 26, 2016 | 20 | 20 |
| Well 3 | 5,237,136 | 4,765,000 June 26, 2016 | 21 | 21 |
| Well 4 | 7,855,632 | 5,595,000 June 30, 2016 | 0 | 0 |
| Well 5 | 5,891,760 | 3,433,000 February 2, 2016 | 0 | 0 |
| Well 6 | 3,469,536 | 1,753,500 April 6, 2016 | 0 | 0 |

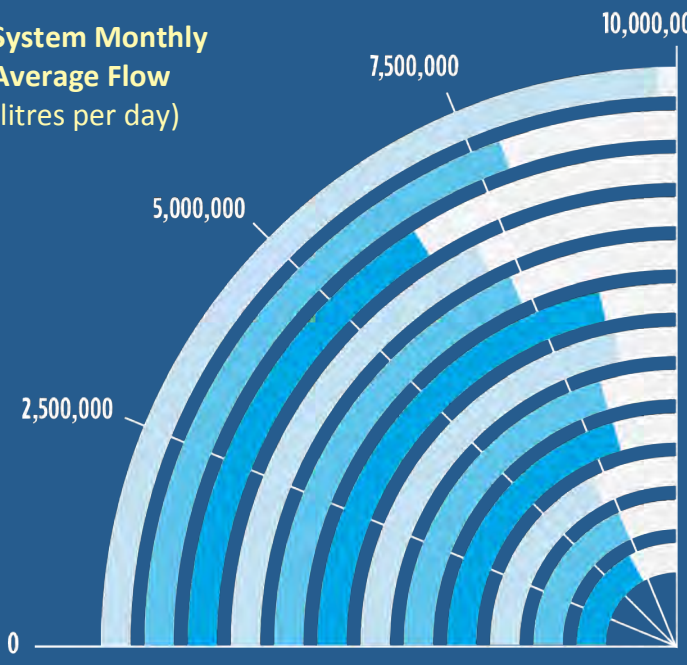
## Withdrawal from the Aurora Production Wells Jan. 1 to Dec. 31, 2016

Actual Annual Withdrawal
2,842,309,000 litres

Annual Permitted Withdrawal
11,540,914,560 litres

Percentage of Permitted Annual Withdrawal
25 per cent

## System Monthly Average Flow
(litres per day)




| | |
|---|---|
| JANUARY | 9,798,065 |
| FEBRUARY | 7,850,483 |
| MARCH | 6,399,387 |
| APRIL | 7,040,933 |
| MAY | 7,287,952 |
| JUNE | 8,618,417 |
| JULY | 8,741,839 |
| AUGUST | 8,179,500 |
| SEPTEMBER | 8,195,900 |
| OCTOBER | 6,944,258 |
| NOVEMBER | 7,303,900 |
| DECEMBER | 6,836,435 |

# Holland Landing

## Drinking Water System

**York Drinking Water Sub-System:** Groundwater, Surface Water – Lake Ontario Blended Supply

| Chlorine | Ultraviolet Disinfection | Enhanced Treatment | Sodium Silicate | Filtration |

Holland Landing is a village in the Town of East Gwillimbury, located in the northern part of York Region. It sits roughly between Yonge Street, Highway 11, Mount Albert Road and Queensville Sideroad. York Region manages the water supply of two wells, two elevated storage tanks and one booster pumping station. Lake Ontario water is also supplied from the south by the York Drinking Water System (York DWS). The Town of East Gwillimbury maintains and distributes the water to consumers from the Regional Supply.

The Holland Landing Drinking Water System is part of an interconnecting system between Aurora, Holland Landing, Queensville, Newmarket and the larger York DWS. Connection to the York DWS reduces demand on the aquifer and provides a secure secondary source of drinking water.

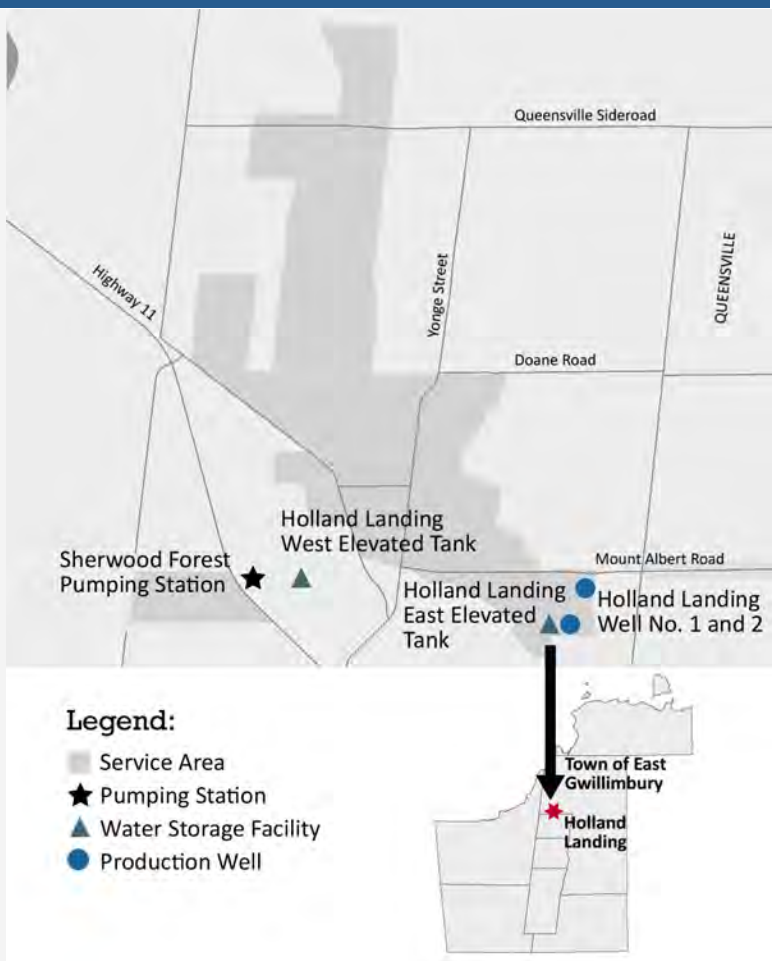
**Raw Water Source Description**

Groundwater taking is regulated by a Permit to Take Water issued by the Ministry of the Environment and Climate Change. The City of Toronto and Peel Region have permits for taking Lake Ontario water. Supply agreements govern the purchase of water from the City of Toronto and Peel Region. Two wells extract groundwater from a deep aquifer. Iron, manganese and hardness levels are naturally elevated, which is common in deep aquifers across York Region. Staff use raw water test results to monitor the health of the aquifer and determine the best water treatment.

**Water Treatment and Supply**

Disinfection is maintained with chlorine gas and ammonia (chloramine). Sodium silicate is added to manage iron and manganese in the distribution system. The storage facilities hold water for peak demand use, and maintain pressure in the system. The booster pumping station also maintains pressure.

In addition to routine water testing and facility inspections by Operators, online analyzers continuously monitor the treatment and delivery processes. These analyzers trigger alarms and automatically shut down and lockout pumps to notify Operators when immediate attention is needed on site.




### Summary of Approvals and Permits

**Municipal Drinking Water Licence Number**: 013 101
Issue Date: October 26, 2016
Expiry Date: January 26, 2020

**Drinking Water Works Permit Number**: 013 201
Issue Date: June 11, 2015

**Permit to Take Water Number**: 6728 9NLQ2F
Issue Date: September 12, 2014
Expiry Date: December 31, 2023

**Operational Plan Number**: 013 401

**Financial Plan Number**: 013 301A

**MOECC Waterworks Number**: 220004046

# Holland Landing Drinking Water System Performance Summary

| 2016 Treated Water Tests | Hardness | Sodium | Fluoride | Chlorine | E. coli | Total Coliforms |
|---|---|---|---|---|---|---|
| Average Results | 168 mg/L | 22 mg/L | 0.19 mg/L | 2.11 mg/L | Not Detected | Not Detected |

## Permitted and Actual Maximum Daily Withdrawal from the Holland Landing Production Wells for January 1 to December 31, 2016

| Location | Permitted Daily Withdrawal (litres) | Actual Maximum Daily Withdrawal (litres) | Days Operating at Peak Capacity (May to October) | Number of Days Operating at Peak Capacity (Annual) |
|---|---|---|---|---|
| Well 1 | 2,291,184 | 1,859,500<br>January 24, 2016 | 0 | 1 |
| Well 2 | 3,600,432 | 2,985,250<br>January 24, 2016 | 1 | 2 |

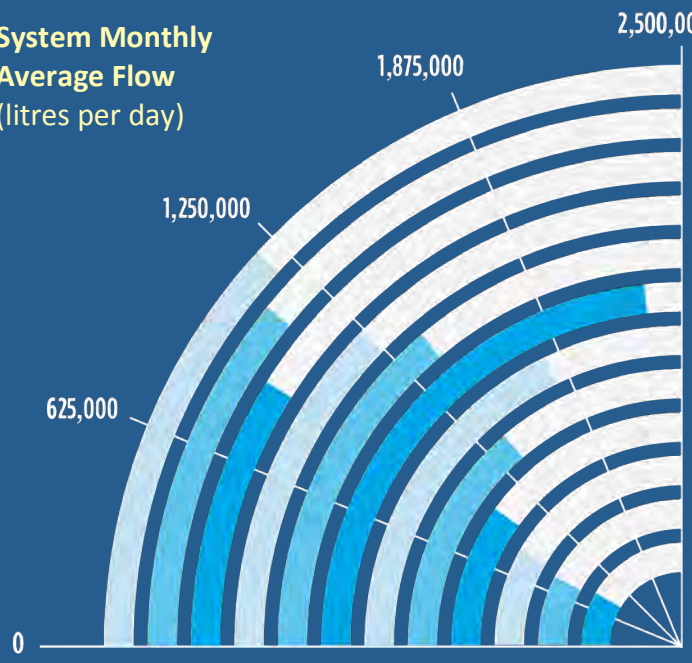
### Withdrawal from the Holland Landing Production Wells Jan. 1 to Dec. 31, 2016

Actual Annual Withdrawal
406,164,375 litres

Annual Permitted Withdrawal
2,150,439,840 litres

Percentage of Permitted Annual Withdrawal
19 per cent

### System Monthly Average Flow
(litres per day)



# King City

## Drinking Water System

**York Drinking Water Sub-System:** Groundwater, Surface Water – Lake Ontario Blended Supply

| Chlorine | Ultraviolet Disinfection | Enhanced Treatment | Sodium Silicate | Filtration |

King City is a community centred on King Road and Keele Street, in the south-east corner of the Township of King. In 2016, the community of King City received all of its water from Lake Ontario through the York Drinking Water System (York DWS). York Region maintains two groundwater wells in King City as backup water supply. York Region stores water in King City with two elevated storage tanks. The Township of King maintains and distributes the water to consumers from the Regional Supply.

The King City Drinking Water System is part of an interconnecting system between Aurora, Holland Landing, Queensville, Newmarket and the larger York DWS. The York DWS is the primary source of drinking water in King City, and the aquifer would provide a secondary source of drinking water if needed.

**Raw Water Source Description**

Groundwater taking is regulated by a Permit to Take Water issued by the Ministry of the Environment and Climate Change. The City of Toronto and Peel Region have permits for taking Lake Ontario water. Supply agreements govern the purchase of water from the City of Toronto and Peel Region. Two wells extract groundwater from a deep aquifer. Iron, manganese and hardness levels are naturally elevated, which is common in deep aquifers across York Region. Staff use raw water test results to monitor the health of the aquifer and determine the best water treatment.

**Water Treatment and Supply**

Disinfection is maintained with chloramine prior to entry to the York DWS. Sodium silicate manages iron and manganese in the distribution system. The groundwater system is upgraded to provide chloramine disinfection in case the wells are needed in an emergency. The storage facilities hold water for peak demand use, and maintain pressure in the system.

In addition to routine water testing and facility inspections by Operators, online analyzers continuously monitor the treatment and delivery processes. These analyzers trigger alarms and automatically shut down and lockout pumps to notify Operators when immediate attention is needed on site.


### Summary of Approvals and Permits

**Municipal Drinking Water Licence Number**: 013 101
Issue Date: October 26, 2016
Expiry Date: January 26, 2020

**Drinking Water Works Permit Number**: 013 201
Issue Date: June 11, 2015

**Permit to Take Water Number**: 1407 9MRQYL
Issue Date: September 5, 2014
Expiry Date: December 31, 2024

**Operational Plan Number**: 013 401

**Financial Plan Number**: 013 301A

**MOECC Waterworks Number**: 220002299

# King City Drinking Water System Performance Summary

| 2016 Treated Water Tests | Hardness | Sodium | Fluoride | Chlorine | E. coli | Total Coliforms |
|---|---|---|---|---|---|---|
| Average Results | 131 mg/L | 25 mg/L | 0.51 mg/L | 1.86 mg/L | Not Detected | Not Detected |

## Permitted and Actual Maximum Daily Withdrawal from the King City Production Wells for January 1 to December 31, 2016

| Location | Permitted Daily Withdrawal (litres) | Actual Maximum Daily Withdrawal (litres) | Days Operating at Peak Capacity (May to October) | Number of Days Operating at Peak Capacity (Annual) |
|---|---|---|---|---|
| Well 3 | 1,963,915 | 24,900<br>January 12, 2016 | 0 | 0 |
| Well 4 | 2,618,554 | 51,938<br>January 19, 2016 | 0 | 0 |

**Withdrawal from the King City Production Wells Jan. 1 to Dec. 31, 2016**

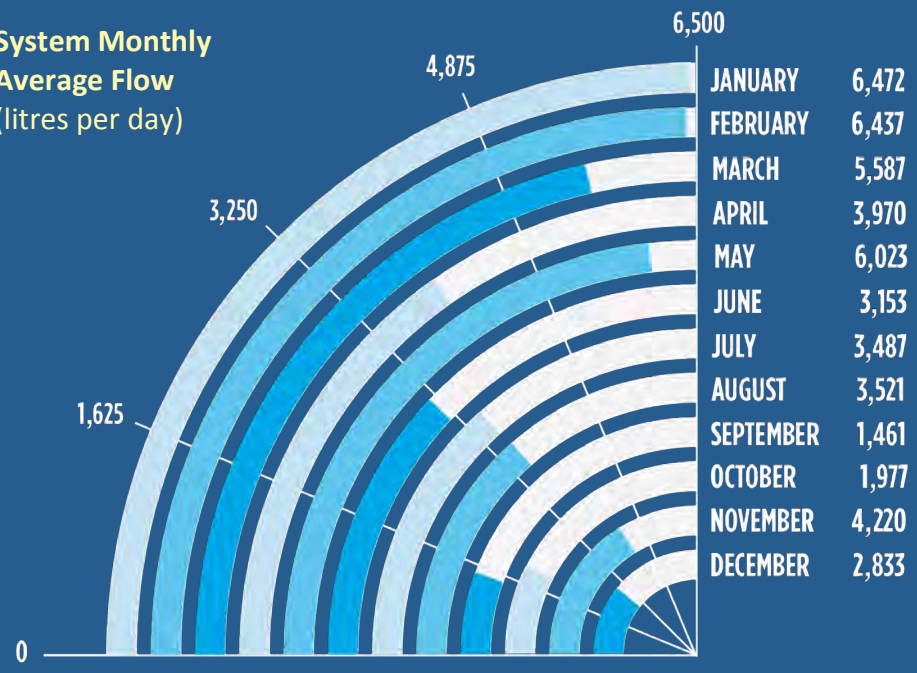
Actual Annual Withdrawal
1,497,625 litres

Annual Permitted Withdrawal
1,672,601,185 litres

Percentage of Permitted Annual Withdrawal
0 per cent

**Note: in 2016, water from King City wells was used for testing, not for supply**

**System Monthly Average Flow**
(litres per day)



# Kleinburg

## Drinking Water System

**York Drinking Water Sub-System:** Groundwater, Surface Water – Lake Ontario Blended Supply

| Chlorine | Ultraviolet Disinfection | Enhanced Treatment | Sodium Silicate | Filtration |

Kleinburg is a village in the City of Vaughan. In 2016, the village of Kleinburg received all of its water from Lake Ontario through the York Drinking Water System (York DWS). York Region maintains two groundwater wells in Kleinburg as backup water supply. York Region stores water in the village of Kleinburg with one elevated storage tank and boosts pressure with two pumping stations. The City of Vaughan maintains and distributes the water to consumers from the Regional Supply.

The Kleinburg Drinking Water System is part of the larger York DWS. The York DWS is the primary source of drinking water in Kleinburg, and the aquifer would provide a secondary source of drinking water if needed.

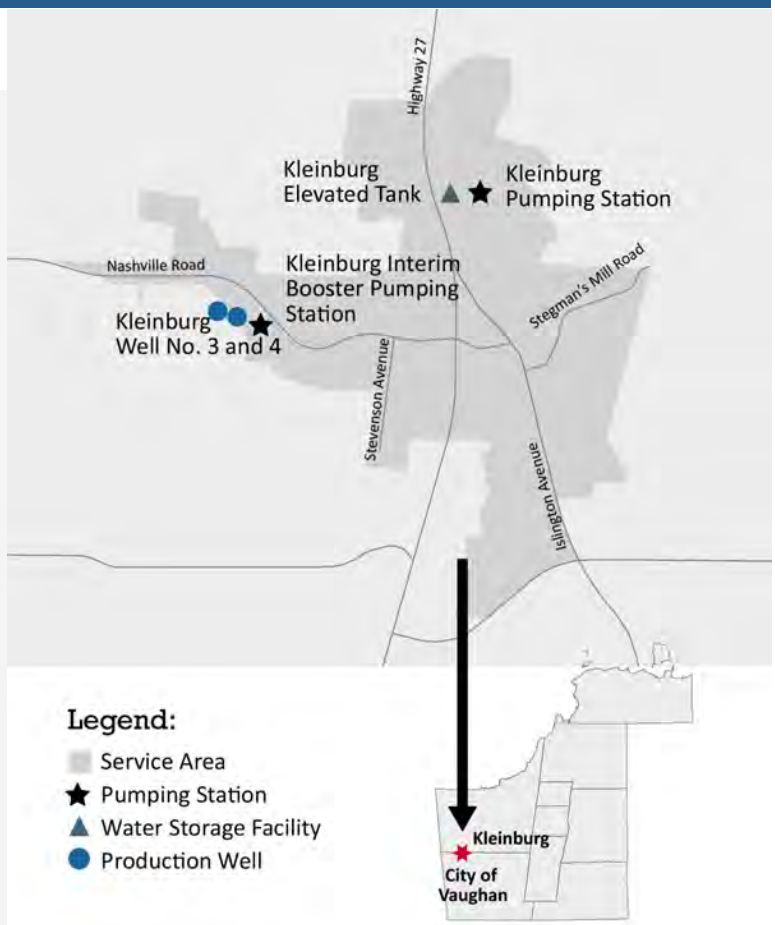
**Raw Water Source Description**

Groundwater taking is regulated by a Permit to Take Water issued by the Ministry of the Environment and Climate Change. The City of Toronto and Peel Region have permits for taking Lake Ontario water. Supply agreements govern the purchase of water from the City of Toronto and Peel Region. Two wells extract groundwater from a deep aquifer. Iron, manganese and hardness levels are naturally elevated, which is common in deep aquifers across York Region. Staff use raw water test results to monitor the health of the aquifer and determine the best water treatment.

**Water Treatment and Supply**

Disinfection is maintained with chloramine prior to entry to the York DWS. Sodium silicate manages iron and manganese in the distribution system. The groundwater system is being upgraded to provide chloramine disinfection in case the wells are needed in an emergency. The storage facilities hold water for peak demand use, and maintain pressure in the system.

In addition to routine water testing and facility inspections by Operators, online analyzers continuously monitor the treatment and delivery processes. These analyzers trigger alarms and automatically shut down and lockout pumps to notify Operators when immediate attention is needed on site.




### Summary of Approvals and Permits

**Municipal Drinking Water Licence Number**: 013 101
Issue Date: October 26, 2016
Expiry Date: January 26, 2020

**Drinking Water Works Permit Number**: 013 201
Issue Date: June 11, 2015

**Permit to Take Water Number**: 2485 9W8KUW
Issue Date: May 29, 2015
Expiry Date: May 31, 2020

**Operational Plan Number**: 013 401

**Financial Plan Number**: 013 301A

**MOECC Waterworks Number**: 220002360

# Kleinburg Drinking Water System Performance Summary

| 2016 Treated Water Tests | Hardness | Sodium | Fluoride | Chlorine | E. coli | Total Coliforms |
|---|---|---|---|---|---|---|
| Average Results | 131 mg/L | 25 mg/L | 0.48 mg/L | 1.71 mg/L | Not Detected | 1 Occurrence |

## Permitted and Actual Maximum Daily Withdrawal from the Kleinburg Production Wells for January 1 to December 31, 2016

| Location | Permitted Daily Withdrawal (litres) | Actual Maximum Daily Withdrawal (litres) | Days Operating at Peak Capacity (May to October) | Number of Days Operating at Peak Capacity (Annual) |
|---|---|---|---|---|
| Wells 3 & 4 | 5,237,000 | 695,216<br>October 5, 2016 | 0 | 0 |

**Withdrawal from the Kleinburg Production Wells Jan. 1 to Dec. 31, 2016**

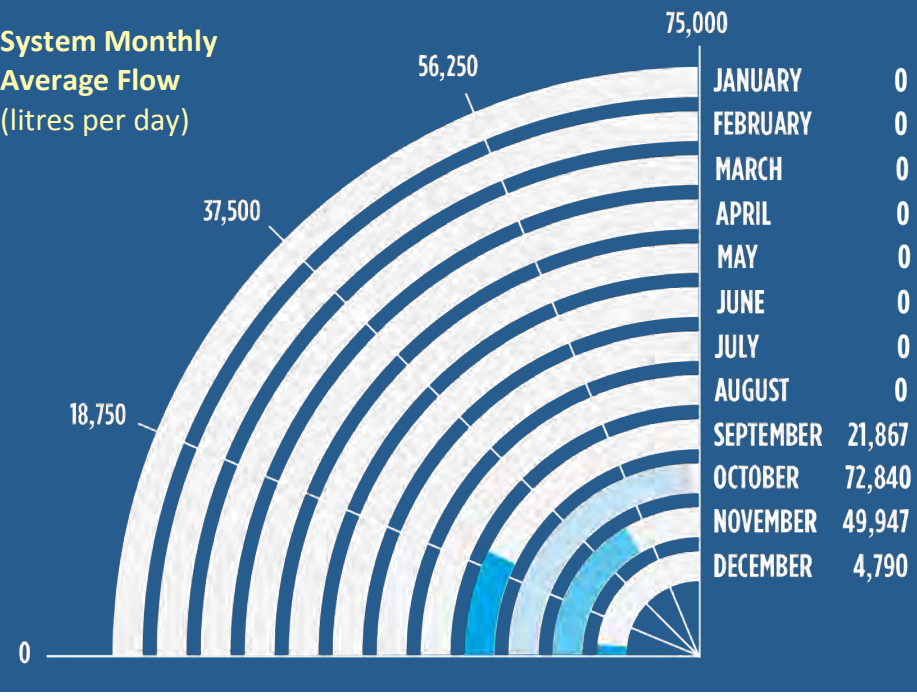
Actual Annual Withdrawal
4,560,978 litres

Annual Permitted Withdrawal
1,911,505,000 litres

Percentage of Permitted Annual Withdrawal
0 per cent

**Note: in 2016, water from Kleinburg wells was used for testing system upgrades**

**System Monthly Average Flow**
(litres per day)



# Newmarket

## Drinking Water System

**York Drinking Water Sub-System:** Groundwater, Surface Water – Lake Ontario Blended Supply

| Chlorine | Ultraviolet Disinfection | Enhanced Treatment | Sodium Silicate | Filtration |

Newmarket is a town located centrally in York Region. York Region manages the water supply of six wells, four elevated storage tanks, two underground storage reservoirs, and two booster pumping stations. Lake Ontario water is also supplied by the York Drinking Water System (York DWS). Newmarket wells were taken offline in April 2016 for a system optimization project, with water supplied by the York, Aurora and Queensville Drinking Water Systems. The Town of Newmarket maintains and distributes the water to consumers.

The Newmarket Drinking Water System is part of the larger York DWS. Connection to the York DWS reduces demand on the aquifer and provides a secure secondary source of drinking water.

**Raw Water Source Description**

Groundwater taking is regulated by a Permit to Take Water issued by the Ministry of the Environment and Climate Change. The City of Toronto and Peel Region have permits for taking Lake Ontario water. Supply agreements govern the purchase of water from the City of Toronto and Peel Region. Wells extract groundwater from deep and shallow aquifers. Iron, manganese and hardness levels are naturally elevated, which is common in deep aquifers across York Region. Staff use raw water test results to monitor the health of the aquifer and determine the best water treatment.

**Water Treatment and Supply**

Disinfection is maintained with chlorine and ammonia (chloramine). Chlorine gas is used at most wells, except Well 14 which uses sodium hypochlorite. Sodium silicate is added to manage iron and manganese in the distribution system. The storage facilities hold water for peak demand use, and maintain pressure in the system. Disinfection is boosted at some storage facilities. Two booster pumping stations also maintain pressure.

In addition to routine water testing and facility inspections by Operators, online analyzers continuously monitor the treatment and delivery processes. These analyzers trigger alarms and automatically shut down and lockout pumps to notify Operators when immediate attention is needed on site.


### Summary of Approvals and Permits

**Municipal Drinking Water Licence Number**: 013 101
Issue Date: October 26, 2016
Expiry Date: January 26, 2020

**Drinking Water Works Permit Number**: 013 201
Issue Date: June 11, 2015

**Permit to Take Water Number**: 6728 9NLQ2F
Issue Date: September 12, 2014
Expiry Date: December 31, 2023

**Operational Plan Number**: 013 401

**Financial Plan Number**: 013 301A

**MOECC Waterworks Number**: 220002413

# Newmarket Drinking Water System Performance Summary

| 2016 Treated Water Tests | Hardness | Sodium | Fluoride | Chlorine | E. coli | Total Coliforms |
|---|---|---|---|---|---|---|
| Average Results | 155 mg/L | 21 mg/L | 0.35 mg/L | 2.21 mg/L | Not Detected | 3 Occurrences |

## Permitted and Actual Maximum Daily Withdrawal from the Newmarket Production Wells for January 1 to December 31, 2016

| Location | Permitted Daily Withdrawal (litres) | Actual Maximum Daily Withdrawal (litres) | Days Operating at Peak Capacity (May to October) | Number of Days Operating at Peak Capacity (Annual) |
|---|---|---|---|---|
| Well 1 | 2,291,184 | 1,178,750 March 6, 2016 | 0 | 0 |
| Well 2 | 4,582,512 | 2,527,000 February 7, 2016 | 0 | 0 |
| Well 13 | 5,891,760 | 3,205,500 February 13, 2016 | 0 | 0 |
| Well 14 | 2,291,184 | Offline | 0 | 0 |
| Well 15 | 3,273,120 | 1,626,500 March 6, 2016 | 0 | 0 |
| Well 16 | 5,629,824 | 3,405,125 March 6, 2016 | 0 | 0 |

**Withdrawal from the Newmarket Production Wells Jan. 1 to Dec. 31, 2016**

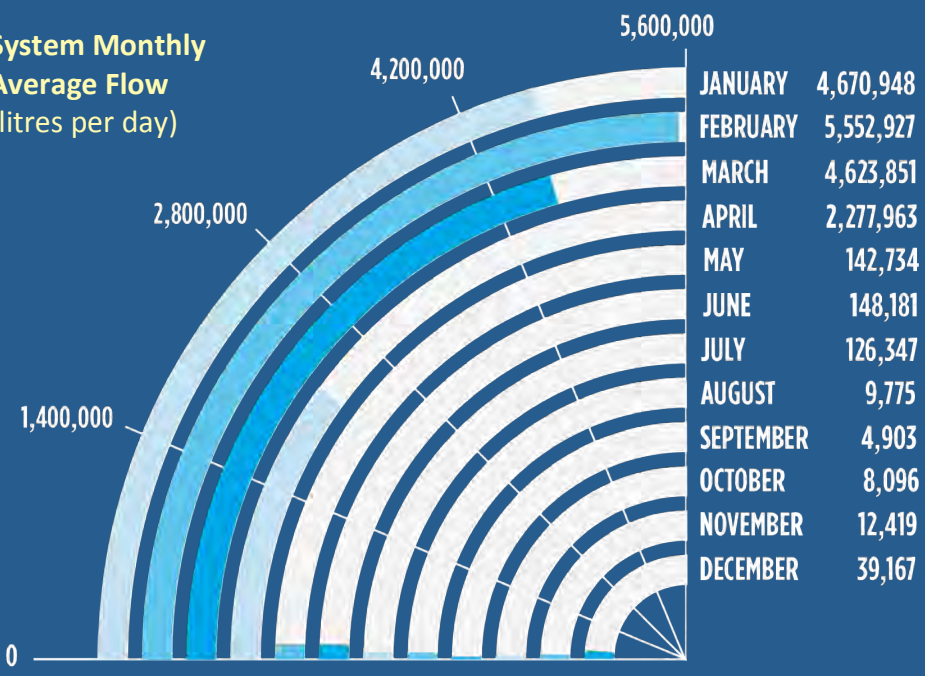
Actual Annual Withdrawal
532,587,328 litres

Annual Permitted Withdrawal
8,745,248,160 litres

Percentage of Permitted Annual Withdrawal
6 per cent

**Note: in April 2016, Newmarket wells were taken offline and operated only for the optimization project**

**System Monthly Average Flow**
(litres per day)



# Sharon/Queensville

## Drinking Water System

**York Drinking Water Sub-System:** Groundwater, Surface Water – Lake Ontario Blended Supply

| Chlorine | Ultraviolet Disinfection | Enhanced Treatment | Sodium Silicate | Filtration |

Queensville and Sharon are villages in the Town of East Gwillimbury. York Region manages the water supply of four wells and one elevated storage tank. Lake Ontario water is also supplied from the south by the York Drinking Water System (York DWS). Much of the water produced in Queensville and Sharon is distributed to Holland Landing and to Newmarket through the York DWS. The Town of East Gwillimbury maintains and distributes the water to consumers from the Regional Supply.

The Sharon/Queensville Drinking Water Sub-System is part of an interconnecting system between Aurora, Holland Landing, Queensville, Newmarket and the larger York DWS. Connection to the York DWS reduces demand on the aquifers and provides a secure secondary source of drinking water.

**Raw Water Source Description**
Groundwater taking is regulated by a Permit to Take Water issued by the Ministry of the Environment and Climate Change. The City of Toronto and Peel Region have permits for taking Lake Ontario water. Supply agreements govern the purchase of water from the City of Toronto and Peel Region. Four wells extract groundwater from a deep aquifer. Iron, manganese and hardness levels are naturally elevated, which is common in deep aquifers across York Region. Staff use raw water test results to monitor the health of the aquifer and determine the best water treatment.

**Water Treatment and Supply**
Disinfection is maintained with chlorine gas and ammonia (chloramine). Sodium silicate is added to manage iron and manganese in the distribution system. The storage facility holds water for peak demand use and maintains pressure in the system.

In addition to routine water testing and facility inspections by Operators, online analyzers continuously monitor the treatment and delivery processes. These analyzers trigger alarms and automatically shut down and lockout pumps to notify Operators when immediate attention is needed on site.


### Summary of Approvals and Permits

**Municipal Drinking Water Licence Number**: 013 101
Issue Date: October 26, 2016
Expiry Date: January 26, 2020

**Drinking Water Works Permit Number**: 013 201
Issue Date: June 11, 2015

**Permit to Take Water Number**: 6728 9NLQ2F
Issue Date: September 12, 2014
Expiry Date: December 31, 2023

**Operational Plan Number**: 013 401

**Financial Plan Number**: 013 301A

**MOECC Waterworks Number**: 220001955

# Sharon/Queensville Drinking Water System Performance Summary

| 2016 Treated Water Tests | Hardness | Sodium | Fluoride | Chlorine | E. coli | Total Coliforms |
|---|---|---|---|---|---|---|
| Average Results | 168 mg/L | 18 mg/L | 0.18 mg/L | 2.30 mg/L | Not Detected | Not Detected |

## Permitted and Actual Maximum Daily Withdrawal from the Sharon/Queensville Production Wells for January 1 to December 31, 2016

| Location | Permitted Daily Withdrawal (litres) | Actual Maximum Daily Withdrawal (litres) | Days Operating at Peak Capacity (May to October) | Number of Days Operating at Peak Capacity (Annual) |
|---|---|---|---|---|
| Well 1 | 6,546,384 | 5,296,000<br>August 13, 2016 | 1 | 1 |
| Well 2 | 6,546,384 | 4,195,000<br>June 24, 2016 | 0 | 0 |
| Well 3 | 6,546,384 | 4,244,000<br>June 24, 2016 | 0 | 0 |
| Well 4 | 6,546,384 | 5,970,000<br>November 24, 2016 | 0 | 1 |

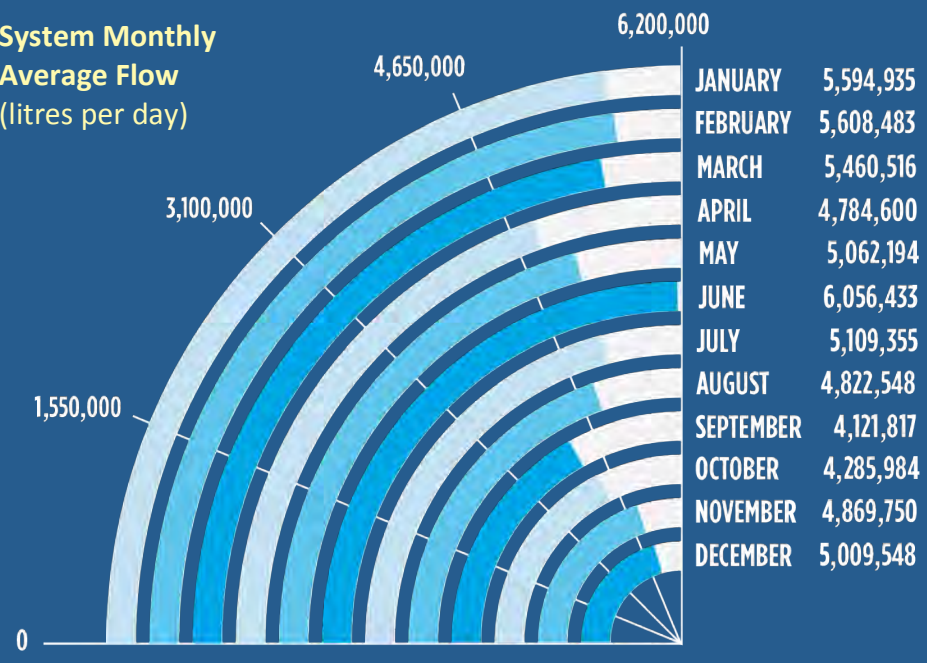
### Withdrawal from the Sharon/Queensville Production Wells Jan. 1 to Dec. 31, 2016

Actual Annual Withdrawal
1,853,321,500 litres

Annual Permitted Withdrawal
9,557,720,640 litres

Percentage of Permitted Annual Withdrawal
19 per cent

### System Monthly Average Flow
(litres per day)



# Stouffville

## Drinking Water System

**York Drinking Water Sub-System:** Groundwater, Surface Water – Lake Ontario Blended Supply

| Chlorine | Ultraviolet Disinfection | Enhanced Treatment | Sodium Silicate | Filtration |

Stouffville is a community located in the Town of Whitchurch-Stouffville. York Region manages the water supply of five wells, two elevated storage tanks, one underground reservoir and three booster pumping stations. Lake Ontario water is also supplied by the York Drinking Water System (York DWS). The Town of Whitchurch-Stouffville maintains and distributes the water to consumers from the Regional Supply.

Connection to the York DWS reduces demand on the aquifers and provides a secure secondary source of drinking water.

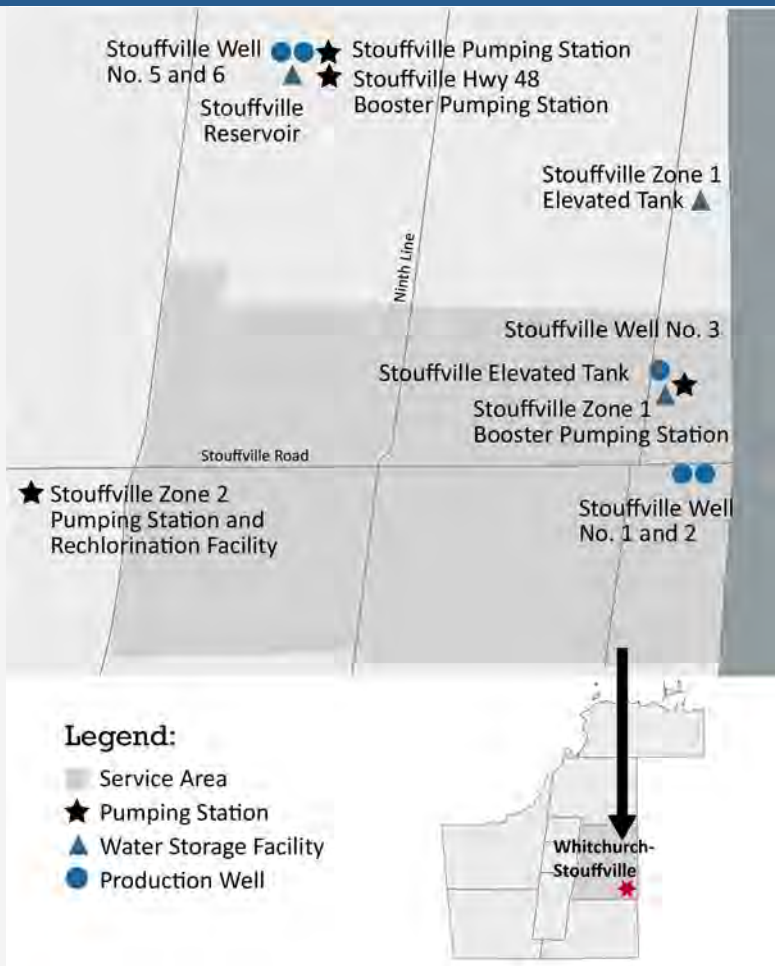
**Raw Water Source Description**

Groundwater taking is regulated by a Permit to Take Water issued by the Ministry of the Environment and Climate Change. The City of Toronto and Peel Region have permits for taking Lake Ontario water. Supply agreements govern the purchase of water from the City of Toronto and Peel Region. Wells 1 and 2 extract groundwater from a deep aquifer. Wells 3, 5 and 6 extract water from a shallow aquifer. Elevated chloride, sulphate and sodium concentrations are found in the shallow aquifer. Iron, manganese and hardness levels are naturally elevated in the deep aquifer.

**Water Treatment and Supply**

Water is disinfected with chlorine. Water from the York DWS is treated to convert chloramine to free chlorine. Wells 1 and 2 are treated with sodium hypochlorite. Wells 3, 5 and 6 are treated with chlorine gas. Wells 5 and 6 are first treated with ultraviolet light because they are classified as Groundwater Under Direct Influence of surface water (GUDI). Sodium silicate is added to manage iron and manganese in the distribution system. Storage facilities hold water and maintain pressure in the system. The three booster pumping stations also maintain pressure and control disinfection.

In addition to routine water testing and facility inspections by Operators, online analyzers continuously monitor the treatment and delivery processes. These analyzers trigger alarms and automatically shut down and lockout pumps to notify Operators when immediate attention is needed on site.




### Summary of Approvals and Permits

**Municipal Drinking Water Licence Number**: 013 101
Issue Date: October 26, 2016
Expiry Date: January 26, 2020

**Drinking Water Works Permit Number**: 013 201
Issue Date: June 11, 2015

**Permit to Take Water Number**: 7104 986FSJ
Issue Date: July 12, 2013
Expiry Date: March 31, 2017

**Operational Plan Number**: 013 401

**Financial Plan Number**: 013 301A

**MOECC Waterworks Number**: 220002333

# Stouffville Drinking Water System Performance Summary

| 2016 Treated Water Tests | Hardness | Sodium | Fluoride | Chlorine | E. coli | Total Coliforms |
|---|---|---|---|---|---|---|
| Average Results | 331 mg/L | 35 mg/L | 0.11 mg/L | 1.48 mg/L | Not Detected | Not Detected |

## Permitted and Actual Maximum Daily Withdrawal from the Stouffville Production Wells for January 1 to December 31, 2016

| Location | Permitted Daily Withdrawal (litres) | Actual Maximum Daily Withdrawal (litres) | Days Operating at Peak Capacity (May to October) | Number of Days Operating at Peak Capacity (Annual) |
|---|---|---|---|---|
| Well 1 | 2,946,240 | 2,831,131 July 18, 2016 | 3 | 4 |
| Well 2 | 2,946,240 | 2,817,348 June 26, 2016 | 6 | 6 |
| Well 3 | 2,946,240 | 2,924,945 July 27, 2016 | 38 | 38 |
| Well 5 | 3,110,400 | 2,878,050 June 26, 2016 | 1 | 1 |
| Well 6 | 2,289,600 | 1,722,680 August 14, 2016 | 0 | 0 |

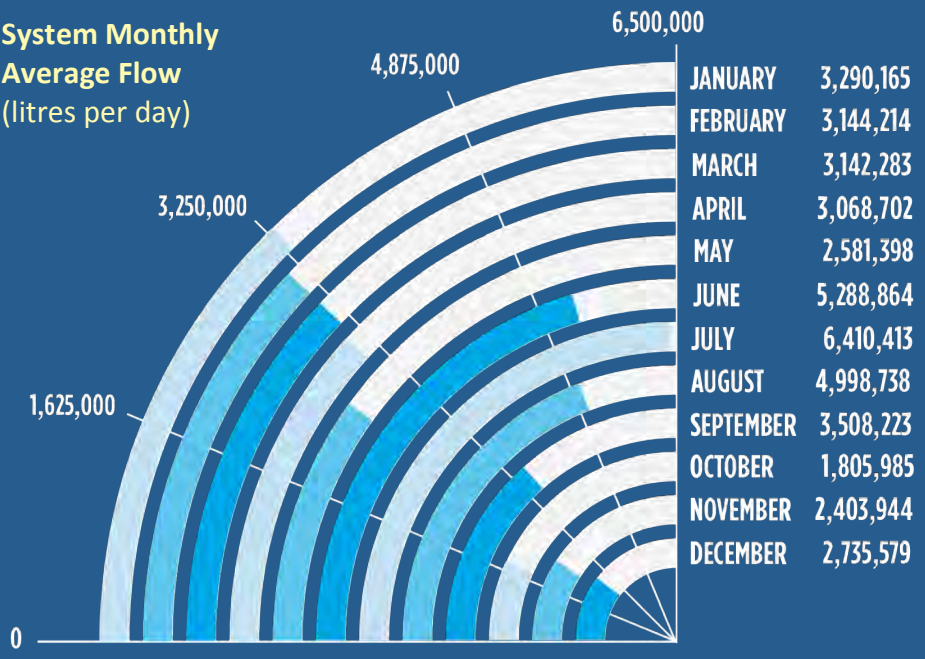
**Withdrawal from the Stouffville Production Wells Jan. 1 to Dec. 31, 2016**

Actual Annual Withdrawal
1,293,175,576 litres

Annual Permitted Withdrawal
5,197,132,800 litres

Percentage of Permitted Annual Withdrawal
25 per cent

**System Monthly Average Flow**
(litres per day)



# Georgina

## Drinking Water System

Surface Water – Lake Simcoe Supply

| Chlorine | Ultraviolet Disinfection | Enhanced Treatment | Sodium Silicate | Filtration |

The communities of Keswick and Sutton, and other lakeshore communities, are located on the south shore of Lake Simcoe at the northern end of York Region. York Region manages the water supply of the Georgina Water Treatment Plant (WTP) and one storage facility. The Town of Georgina maintains and distributes the water to consumers from the Regional Supply.

**Raw Water Source Description**

Water taking is regulated by a Permit to Take Water issued by the Ministry of the Environment and Climate Change. A one metre diameter intake pipe on Lake Simcoe draws water from 1.5 kilometres offshore at a depth of 19 metres. A pumping station transfers water to the treatment plant. Local animal and plant populations occasionally contribute to poor source water quality. Lake Simcoe also contains algae, which can add a musty taste or odour to the water supply. Mussel growth on the intake pipe is controlled to prevent obstruction of water flow. Staff use raw water test results to monitor the health of the lake and determine the best water treatment.

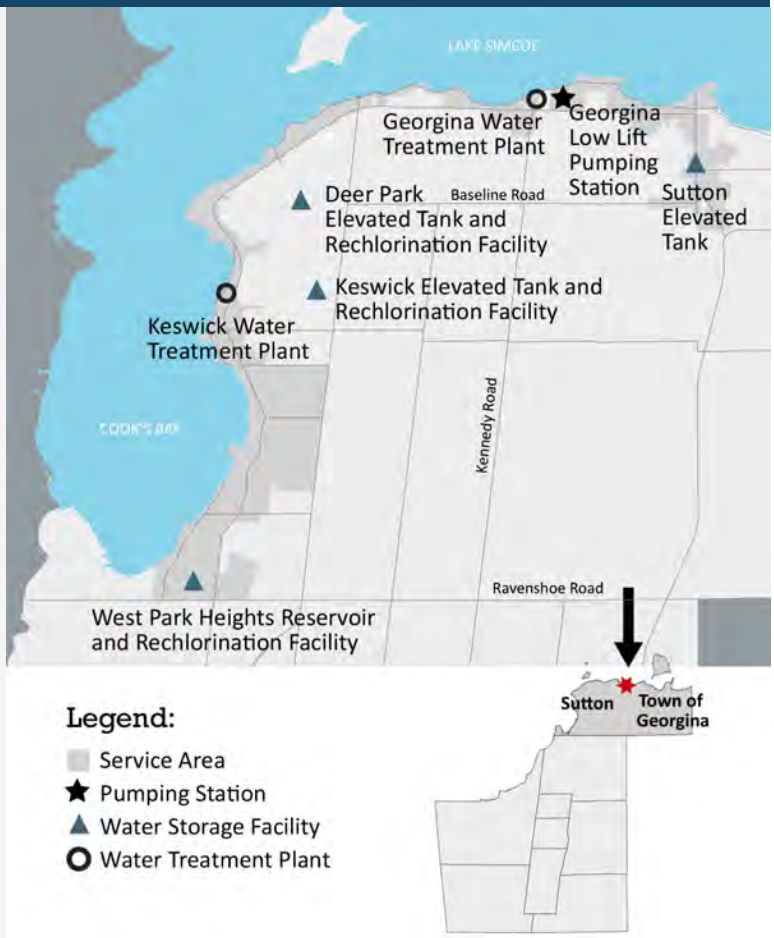
**Water Treatment and Supply**

Georgina WTP treatment process:

- Screening for large objects at the intake pipe
- Diffused chlorine injection at the intake pipe to control mussel growth
- Membrane filtration to remove suspended solids and potentially harmful organisms
- Granular activated carbon (GAC) improves taste and odour
- Disinfection by using ultraviolet light, followed by chlorine

The storage facility holds water for peak demand use, and maintains pressure in the system. Fluoride is applied at the level recommended by the Province.

In addition to routine water testing and facility inspections by Operators, online analyzers continuously monitor the treatment and delivery processes. These analyzers trigger alarms and automatically shut down and lockout pumps to notify Operators when immediate attention is needed on site.




### Summary of Approvals and Permits

**Municipal Drinking Water Licence Number**: 013 104
Issue Date: January 27, 2015
Expiry Date: January 26, 2020

**Drinking Water Works Permit Number**: 013 204
Issue Date: January 27, 2015

**Permit to Take Water Number**: 4523 8TGSMJ
Issue Date: April 24, 2012
Expiry Date: April 23, 2022

**Operational Plan Number**: 013 404

**Financial Plan Number**: 013 301A

**MOECC Waterworks Number**: 260026156

# Georgina Drinking Water System Performance Summary

| 2016 Treated Water Tests | Hardness | Sodium | Fluoride | Chlorine | E. coli | Total Coliforms |
|---|---|---|---|---|---|---|
| Average Results | 140 mg/L | 28 mg/L | 0.51 mg/L | 1.76 mg/L | Not Detected | Not Detected |

## Permitted and Actual Maximum Daily Withdrawal from the Georgina Water Treatment Plant for January 1 to December 31, 2016

| Location | Permitted Daily Withdrawal (litres) | Actual Maximum Daily Withdrawal (litres) | Days Operating at Peak Capacity (May to October) | Number of Days Operating at Peak Capacity (Annual) |
|---|---|---|---|---|
| Water Treatment Plant | 50,000,000 | 18,617,000<br>June 18, 2016 | 0 | 0 |

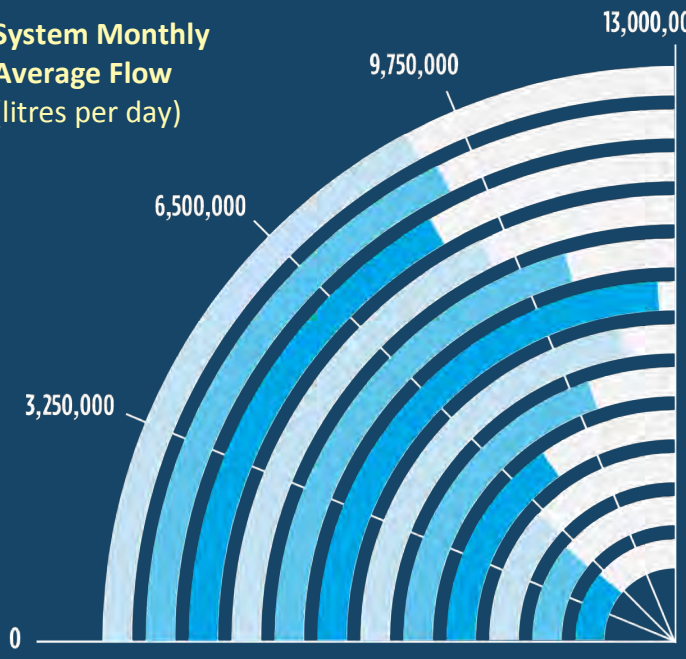
**Withdrawal from the Georgina Water Treatment Plant Jan. 1 to Dec. 31, 2016**

Actual Annual Withdrawal
3,257,458,000 litres

Annual Permitted Withdrawal
10,950,000,000 litres

Percentage of Permitted Annual Withdrawal
30 per cent

**System Monthly Average Flow**
(litres per day)




| | |
|---|---|
| JANUARY | 8,963,452 |
| FEBRUARY | 9,160,448 |
| MARCH | 8,648,710 |
| APRIL | 9,249,167 |
| MAY | 10,685,774 |
| JUNE | 12,592,300 |
| JULY | 11,585,387 |
| AUGUST | 10,291,032 |
| SEPTEMBER | 7,879,500 |
| OCTOBER | 6,131,065 |
| NOVEMBER | 5,760,633 |
| DECEMBER | 5,867,387 |

# Keswick

## Drinking Water System

**Georgina Drinking Water Sub-System:** Surface Water – Lake Simcoe Supply

| Chlorine | Ultraviolet Disinfection | Enhanced Treatment | Sodium Silicate | Filtration |

The community of Keswick is located on the east shore of Cook's Bay at the northern end of York Region. Upgrades to this facility were completed in 2016. When it was offline, the community of Georgina/Keswick was supplied by the Georgina Water Treatment Plant. York Region manages the water supply of the Keswick Water Treatment Plant (WTP) and three dual-purpose storage and rechlorination facilities. The Town of Georgina maintains and distributes the water to consumers from the Regional Supply.

### Raw Water Source Description

Water taking is regulated by a Permit to Take Water issued by the Ministry of the Environment and Climate Change. A 0.6 metre diameter intake pipe on Cook's Bay draws water from 365 metres offshore at a depth of 8.5 metres. Local animal and plant populations occasionally contribute to poor source water quality. Lake Simcoe and Cook's Bay also contain algae, which can give a musty taste or odour to the water supply. Mussel growth on the intake pipe is controlled to prevent obstruction of water flow. Staff use raw water test results to plan water treatment.

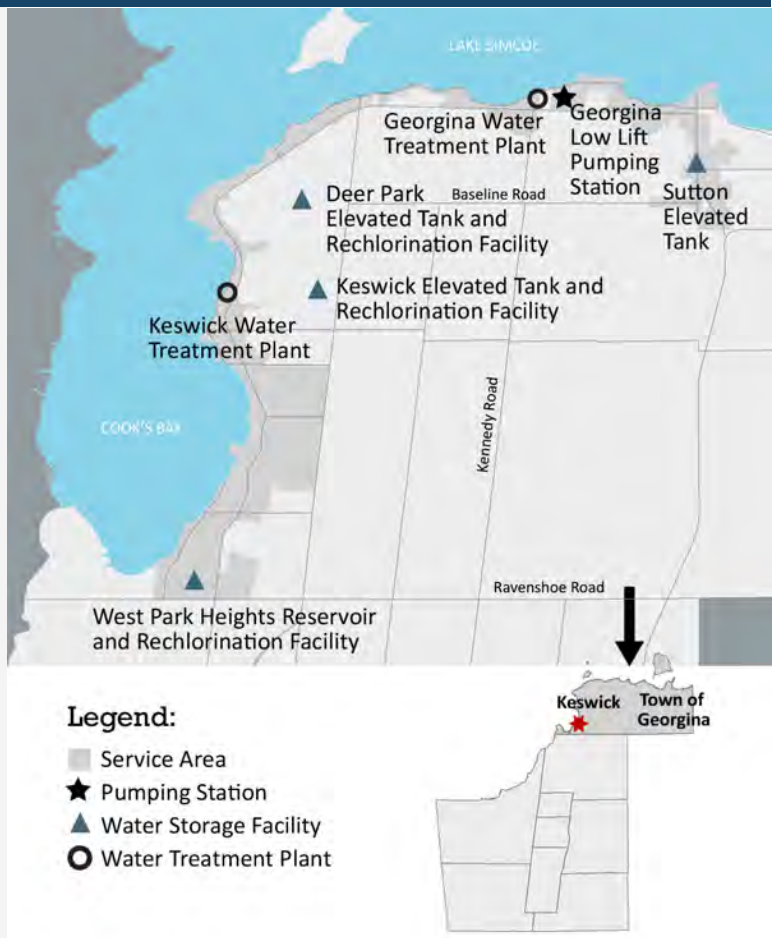
### Water Treatment and Supply

Keswick WTP treatment process:

- Screening for large objects at the intake pipe
- Diffused chlorine injection at the intake pipe to control mussel growth
- Membrane filtration to remove suspended solids and potentially harmful organisms
- Granular activated carbon (GAC) improves taste and odour
- Disinfection by using ultraviolet light, followed by chlorine

The storage facilities hold water for peak demand use, and maintain pressure in the system. Fluoride is applied at the level recommended by the Province.

In addition to routine water testing and facility inspections by Operators, online analyzers continuously monitor the treatment and delivery processes. These analyzers trigger alarms and automatically shut down and lockout pumps to notify Operators when immediate attention is needed on site.




### Summary of Approvals and Permits

**Municipal Drinking Water Licence Number**: 013 104
Issue Date: January 27, 2015
Expiry Date: January 26, 2020

**Drinking Water Works Permit Number**: 013 204
Issue Date: January 27, 2015

**Permit to Take Water Number**: 8413 994JDQ
Issue Date: August 8, 2013
Expiry Date: October 30, 2023

**Operational Plan Number**: 013 404

**Financial Plan Number**: 013 301A

**MOECC Waterworks Number**: 210003280

# Keswick Drinking Water System Performance Summary

| 2016 Treated Water Tests | Hardness | Sodium | Fluoride | Chlorine | E. coli | Total Coliforms |
|---|---|---|---|---|---|---|
| Average Results | 141 mg/L | 28 mg/L | 0.51 mg/L | 1.43 mg/L | Not Detected | Not Detected |

## Permitted and Actual Maximum Daily Withdrawal from the Keswick Water Treatment Plant for January 1 to December 31, 2016

| Location | Permitted Daily Withdrawal (litres) | Actual Maximum Daily Withdrawal (litres) | Days Operating at Peak Capacity (May to October) | Number of Days Operating at Peak Capacity (Annual) |
|---|---|---|---|---|
| Water Treatment Plant | 18,150,000 | 6,288,000<br>October 29, 2016 | 0 | 0 |

**Withdrawal from the Keswick Water Treatment Plant Jan. 1 to Dec. 31, 2016**

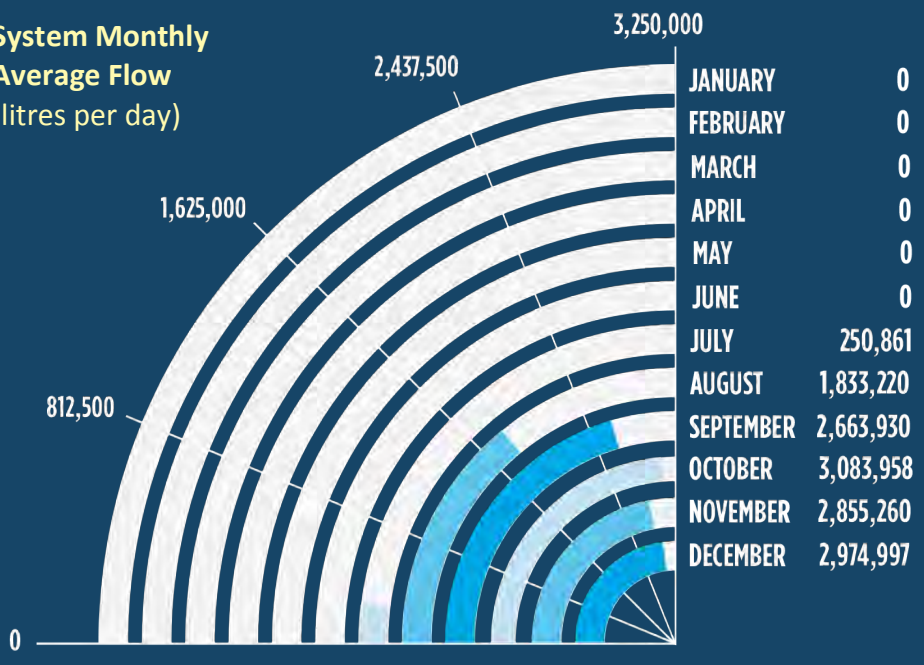
Actual Annual Withdrawal
418,009,810 litres

Annual Permitted Withdrawal
5,927,600,000 litres

Percentage of Permitted Annual Withdrawal
7 per cent

**Note: the Keswick WTP was brought back online after facility upgrades in August 2016.**

**System Monthly Average Flow**
(litres per day)

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York Region

# Glossary of Terms

**Adverse Water Quality Event** – The process of reporting and correcting a water quality measurement or observation that does not meet regulated standards for prescribed laboratory analyzed or field monitored parameters.

**Aquifer** – an underground layer of porous rock, gravel or soil that is filled with water and can be used as a source of groundwater.

**Chloramine** - chlorine and ammonia combined in water forms chloramine, which is used for secondary disinfection as a long lasting disinfectant.

**Chloride** – a chlorine based salt that is tested on a regular basis to assess groundwater conditions. It is found naturally in some rocks and soils, and it also originates from runoff.

**Chlorine** – disinfectant used to kill pathogens in drinking water. Chlorine gas and sodium hypochlorite are both used for chlorine disinfection.

**Disinfection** - destruction of pathogenic organisms capable of causing disease by chemical or physical processes.

**Distribution System** - water supply network consisting of pipes, watermains, valves, pumping stations and water storage facilities that deliver water to consumers. The Region's distribution system carries water from wells or treatment plants to the local municipality distribution system through large transmission mains.

**Drinking Water System (DWS)** - Ministry of the Environment and Climate Change reference for regulated Municipal Drinking Water Systems.

**Drinking Water Works Permit (DWWP)** - permit to establish or alter a drinking water system.

**E. coli** - bacteria found in fecal matter that may be washed into water by rain, snowmelt and other forms of precipitation. It is an indicator of the possible presence of disease causing bacteria.

**Enhanced Treatment** – includes a variety of treatment methods for controlling odours or impurities in the source water.

**Filtration** – a process to physically remove particles or impurities from the source water. It can be accomplished through microporous membranes or granular activated carbon.

**Fluoride** - added to drinking water to help prevent tooth decay. Fluoride can also naturally occur in groundwater. Where fluoride is added to drinking water, it is adjusted to the 0.5 - 0.8 mg/L, the level recommended by the Province.

**Granular Activated Carbon** (GAC) - used to help remove taste and odour causing compounds in drinking water.

**Groundwater** – water that collects below the Earth's surface when precipitation filters through soil and rocks. The upper surface of groundwater is called the water table.

**Groundwater Under Direct Influence (GUDI)** – Groundwater under direct influence of surface water. This is a provincial designation for wells that have a greater potential to be impacted by surface water and runoff. Although these wells are shallow, overlying sediments provide natural filtration. Ultraviolet light is used for primary disinfection of GUDI water sources.

**Hardness** - measures mineral content in water. The two minerals that are most responsible for hardness are calcium and magnesium carbonate. Water hardness can also result in scaling on pipes and appliances. Hardness levels between 80 and 100 mg/L are considered optimal. Water supplies with hardness greater than 200 mg/L are considered poor but tolerable.

**Iron** - often present in groundwater form nearby mineral deposits. It may also be present in surface waters from sediment at the bottom of the water body. Iron is controlled in most distribution systems with sodium silicate.

# Glossary of Terms *- continued*

**Manganese** – a metal that is often found in groundwater due to natural mineral deposits. Manganese is controlled in most distribution systems with sodium silicate.

**Milligrams per Litre (mg/L)** - measure of the concentration of a parameter in water, sometimes referred to as parts per million (ppm).

**Ministry of the Environment and Climate Change (MOECC)** - provincial regulatory agency responsible for regulating and licensing the water and wastewater industry in Ontario.

**Medical Officer of Health (MOH)** - responsible for providing direction to the Operating Authority during adverse water quality events to ensure adequate responses are being followed, and has the authority to issue boil water advisories and orders if necessary.

**Municipal Drinking Water Licence (MDWL)** – a licence for municipal residential drinking water systems, requiring the owner to have a drinking water works permit, a permit to take water, an accepted operational plan, an accredited operating authority and a financial plan.

**Ontario Drinking Water Quality Standards (ODWQS)** - Ontario Regulation 169/03 under the *Safe Drinking Water Act, 2002*. The ODWQS lists the maximum allowable concentrations for many bacteriological, organic and inorganic parameters.

**Permit To Take Water** – a permit issued by the Ministry of the Environment and Climate Change to regulate the quantity and timing of water taking.

**Potassium Permanganate (KMnO4)** - used to treat drinking water for iron, manganese and sulfur odours.

**Raw Water** – untreated surface water or groundwater.

**Sodium** - found naturally in surface and groundwater across southern Ontario. Sodium can also enter groundwater from runoff. Sodium can make the water taste salty at 200mg/L, which is the aesthetic objective. The local Medical Officer of Health is notified when sodium concentration exceeds 20 mg/L in the drinking water system.

**Sodium Hypochlorite** – a type of chlorine used for disinfection in drinking water.

**Sodium Silicate** - used to manage iron in drinking water and reduce the potential for iron stains on plumbing fixtures and laundry.

**Sulphate** – a sulphur based salt that occurs naturally in many soil and rock formations.

**Surface Water** – water that is found at the Earth's surface in lakes, streams or other bodies of water.

**Total Coliform (TC)** - coliform group of bacteria is used to screen for fecal contamination, determine treatment effectiveness and verify distribution system integrity. Total coliforms are free-living in the environment, but are also present in water contaminated with human and animal feces. They usually do not cause disease.

**Treated Water** - water entering the distribution system after the treatment is complete.

**Turbidity** - measures suspended particles or impurities that make water cloudy. More total suspended solids make the water more turbid.

**Ultraviolet Disinfection (UV)** - form of water disinfection. Ultraviolet light emits radiation to disrupt the DNA of any waterborne diseases that pass by. This form of disinfection does not stay in the water – it only acts at the point of application.

Explanations on the health impacts of laboratory results of inorganic and organic parameters can be found in MOECC document #4449e01, Technical Support Document for Ontario Drinking Water Quality Standards, Objectives and Guidelines.

# DRINKING WATER
## SYSTEMS REPORT 2016

The Regional Municipality of York
Environmental Services Department
1-877-464-9675
york.ca

Accessible formats or communications supports
are available upon request.

eDocs # 7235773

York Region

# Summary of Reported Adverse Water Quality Incidents in 2016

The Ministry of the Environment and Climate Change and the Medical Officer of Health were satisfied with the corrective actions taken for all reported events in the summary below and had no further direction.

| Location | Parameter | Event Date(s) (2016) | Result (mg/L except pressure) | Limit (mg/L except pressure) | Corrective Action |
|---|---|---|---|---|---|
| **Ansnorveldt Drinking Water System** | | | | | |
| Ansnorveldt Wells 2 and 3 | System Pressure* | January 26* | 0.0 psi | 20 psi minimum | No adverse conditions caused. Operator restored pressure with pump operation. |
| Ansnorveldt Wells 2 and 3 | Free Chlorine Residual | April 5*<br>December 2 | 5.02<br>0.00 | 0.05 to 4.0 | Operator attended site, facility returned to normal operation. Compliant grab sample taken. |
| **Ballantrae-Musselman's Lake Drinking Water System** | | | | | |
| Ballantrae Well 1 and 2 | System Pressure* | October 28* | 0.0 psi | 20 psi minimum | No adverse conditions caused. Pressure restored automatically. |
| **Georgina Drinking Water System** | | | | | |
| Georgina Water Treatment Plant | Fluoride | February 3<br>February 19<br>March 17<br>March 27<br>April 4<br>June 3 | 2.00<br>2.00<br>2.00<br>1.61<br>1.73<br>2.00 | 1.5 | Flow halted upon alarm and prevented water from entering the distribution system. Operator attended site and returned facility to normal operation. Compliant grab sample taken. |
| | Organic Chemical (Non-Regulated)<br>2-methyl-4-chlorophenoxyacetic acid (MCPA) | April 4 | 0.008 | Not regulated. Report any detection of all non-regulated chemicals. | Operator attended site, resample taken. Trace amounts detected are well below the new MOECC standard of 0.100 mg/L that took effect in January 2017. Medical Officer of Health had no further direction. |

*reported as Best Management Practice or as due diligence measure

**Attachment 2**

| Location | Parameter | Event Date(s) (2016) | Result (mg/L except pressure) | Limit (mg/L except pressure) | Corrective Action |
|---|---|---|---|---|---|
| | Organic Chemical (Non-Regulated) 2,3,4,5 – Tetrachlorophenol (TeCP) | April 4 | 0.0004 | Not regulated. Report any detection of all non-regulated chemicals. | Operator attended site, resample taken. No standard for this chemical. Medical Officer of Health had no further direction. |
| **Georgina Drinking Water System, Keswick Sub-System** | | | | | |
| Keswick Water Treatment Plant | Fluoride | July 30 | 1.77 | 1.5 | Flow halted upon alarm and prevented water from entering the distribution system. Operator attended site and returned facility to normal operation. Compliant grab sample taken. |
| Keswick West Park Heights Reservoir | Sodium | April 4 | 27.5 | 20 | Operator attended site, resample taken. |
| **Mount Albert Drinking Water System** | | | | | |
| Mount Albert North East Elevated Tank | Free Chlorine Residual | June 24<br>December 22* | 0.00<br>4.96 | 0.05 to 4.0 | Operator attended site, facility returned to normal operation. Compliant grab sample taken. |
| **Nobleton Drinking Water System** | | | | | |
| Nobleton Elevated Tank | Sodium | April 20* | 20.1 | 20 | Operator attended site, resample taken. |
| Nobleton North Elevated Tank | Sodium | April 14 | 20.6 | 20 | Operator attended site, resample taken. |



*reported as Best Management Practice or as due diligence measure

| Location | Parameter | Event Date(s) (2016) | Result (mg/L except pressure) | Limit (mg/L except pressure) | Corrective Action |
|---|---|---|---|---|---|
| Nobleton Well 5 | Organic Chemical (Non-Regulated)<br>2-methyl-4-chlorophenoxyacetic acid (MCPA) | April 13 | 0.012 | Not regulated. Report any detection of all non-regulated chemicals. | Operator attended site, resample taken, compliant result below detection limit. Trace amounts detected are well below the new MOECC standard of 0.100 mg/L that took effect in January 2017.<br>Medical Officer of Health had no further direction. |
| **Schomberg Drinking Water System** | | | | | |
| Schomberg Elevated Tank | Combined Chlorine Residual | October 20 | 0.24 | 0.25 to 3.0 | Operator attended site, facility returned to normal operation. Compliant grab sample taken. |
| Schomberg Water Treatment Plant | Combined Chlorine Residual | March 11*<br>March 26<br>March 31<br>May 13*<br>August 9*<br>November 20 | 3.71<br>3.23<br>3.05<br>3.01<br>3.01<br>3.08 | 0.25 to 3.0 | Operator attended site, facility returned to normal operation. Compliant grab sample taken. |
| **York Drinking Water System, Aurora Sub-System** | | | | | |
| Aurora North Reservoir | System Pressure* | March 12* | 0.0 psi | 20 psi minimum | No adverse conditions caused. Pressure restored automatically. |
| Aurora Ridge Road Reservoir | Combined Chlorine Residual | June 9*<br>July 27<br>August 13 | 3.00<br>3.30<br>4.84 | 0.25 to 3.0 | Operator attended site, facility returned to normal operation. Compliant grab sample taken. |



*reported as Best Management Practice or as due diligence measure

| Location | Parameter | Event Date(s) (2016) | Result (mg/L except pressure) | Limit (mg/L except pressure) | Corrective Action |
|---|---|---|---|---|---|
| Aurora South Reservoir | Combined Chlorine Residual | February 16<br>March 6<br>April 2<br>July 15<br>August 16*<br>August 26<br>September 8<br>October 25<br>November 11*<br>December 27* | 4.90<br>5.88<br>3.07<br>4.00<br>3.02<br>3.09<br>3.30<br>3.34<br>4.99<br>4.96 | 0.25 to 3.0 | Operator attended site, facility returned to normal operation. Compliant grab sample taken. |
| Aurora Southwest Elevated Tank | Combined Chlorine Residual | July 15 | 3.87 | 0.25 to 3.0 | Operator attended site, facility returned to normal operation. Compliant grab sample taken. |
| Aurora Wells 1 to 4 Treatment Facility | Nitrate | January 7 | 102 | 10 | Sampling error, resample result below detection limit. |
| | Contact Time not met (low chlorine) | December 14* | Insufficient time | Facility Dependent | Operator attended site, facility returned to normal operation. Compliant grab sample taken. |
| Aurora Well 5 | Nitrate | January 7 | 100 | 10 | Sampling error, resample result below detection limit. |
| Aurora Well 6 | Combined Chlorine Residual | April 21*<br>June 3 | 3.01<br>3.35 | 0.25 to 3.0 | Operator attended site, facility returned to normal operation. Compliant grab sample taken. |
| | Nitrate | January 7 | 100 | 10 | Sampling error, resample result below detection limit. |



*reported as Best Management Practice or as due diligence measure

| Location | Parameter | Event Date(s) (2016) | Result (mg/L except pressure) | Limit (mg/L except pressure) | Corrective Action |
|---|---|---|---|---|---|
| **York Drinking Water System, Holland Landing Sub-System** | | | | | |
| Holland Landing Well 1 | System Pressure* | January 24* | 0.0 psi | 20 psi minimum | No adverse conditions caused. Operators restored pressure by repairing watermain break. |
| | Contact Time not met (low chlorine) | July 21* | Insufficient time | Facility Dependent | Operator on site filled contact tank with pre-treated water, facility returned to normal operation. Compliant grab sample taken. |
| | Sodium | April 13 | 20.3 | 20 | Operator attended site, resample taken. |
| Holland Landing Well 2 | Combined Chlorine Residual | January 1*<br>December 7* | 0.06<br>0.21 | 0.25 to 3.0 | Operator attended site, facility returned to normal operation. Compliant grab sample taken. |
| Holland Landing West Elevated Tank | Combined Chlorine Residual | May 4*<br>August 22 | 3.01<br>3.91 | 0.25 to 3.0 | Operator attended site, facility returned to normal operation. Compliant grab sample taken. |
| | Sodium | April 13* | 21.3 | 20 | Operator attended site, resample taken. |
| **York Drinking Water System, King City Sub-System** | | | | | |
| King City Fisher Street Elevated Tank | Combined Chlorine Residual | January 26 | 3.06 | 0.25 to 3.0 | Operator attended site, facility returned to normal operation. Compliant grab sample taken. |



*reported as Best Management Practice or as due diligence measure

| Location | Parameter | Event Date(s) (2016) | Result (mg/L except pressure) | Limit (mg/L except pressure) | Corrective Action |
|---|---|---|---|---|---|
| **York Drinking Water System, Kleinburg Sub-System (see also Vaughan Community)** | | | | | |
| Kleinburg Elevated Tank | Sodium | April 14 | 25.6 | 20 | Operator attended site, resample taken. |
| | Presence of Total coliform | September 14 | Presence | Presence | Operator attended site, maintained disinfection residual and resampled upstream, downstream and at location, resulting in absence of Total Coliforms. |
| Kleinburg Well 3 and 4 | Combined Chlorine Residual | December 2<br>December 14* | 4.25<br>4.99 | 0.25 to 3.0 | Operator attended site, facility returned to normal operation. Compliant grab sample taken. |
| Kleinburg Whisper Lane Booster Pumping Station | Combined Chlorine Residual | June 27* | 0.00 | 0.25 to 3.0 | Operator testing power generator caused a false reading of zero. Facility returned to normal operation. Compliant grab sample taken. |
| **York Drinking Water System, Newmarket Sub-System** | | | | | |
| Glenway Reservoir | Combined Chlorine Residual | February 13<br>June 7<br>September 1<br>September 27<br>October 3*<br>October 26* | 3.09<br>3.09<br>3.22<br>3.27<br>3.01<br>3.18 | 0.25 to 3.0 | Operator attended site, facility returned to normal operation. Compliant grab sample taken. |
| | Presence of Total coliform | June 28<br>August 15<br>September 6 | Presence | Presence | Operator attended site, maintained disinfection residual and resampled upstream, downstream and at location, resulting in absence of Total Coliforms. Unplanned maintenance also completed. |



*reported as Best Management Practice or as due diligence measure

| Location | Parameter | Event Date(s) (2016) | Result (mg/L except pressure) | Limit (mg/L except pressure) | Corrective Action |
|---|---|---|---|---|---|
| Newmarket Wells 1 and 2 | Combined Chlorine Residual | September 19*<br>September 30*<br>October 5* | 0.18<br>0.19<br>0.23 | 0.25 to 3.0 | Operator attended site, facility returned to normal operation. Compliant grab sample taken. |
| Newmarket Well 15 | Combined Chlorine Residual | October 15* | 0.07 | 0.25 to 3.0 | Operator attended site, facility returned to normal operation. Compliant grab sample taken. |
| **York Drinking Water System, Sharon/Queensville Sub-System** | | | | | |
| Queensville Elevated Tank | System Pressure* | January 15*<br>January 20*<br>February 1*<br>May 13*<br>August 3*<br>August 4* | 14.6 psi<br>18.0 psi<br>19.0 psi<br>9.5 psi<br>18.0 psi<br>0.0 psi | 20 psi minimum | Single minute reading due to change in flow direction. No adverse conditions caused. Pressure restored automatically. |
| Sharon/ Queensville Wells 1 and 2 | Combined Chlorine Residual | October 26* | 3.01 | 0.25 to 3.0 | Operator attended site, facility returned to normal operation. Compliant grab sample taken. |
| Sharon/ Queensville Wells 3 and 4 | Combined Chlorine Residual | January 12*<br>March 21<br>March 24*<br>June 29 | 3.03<br>3.07<br>3.01<br>3.30 | 0.25 to 3.0 | Operator attended site, facility returned to normal operation. Compliant grab sample taken. |
| | Sodium | April 17 | 22.4 | 20 | Operator attended site, resample taken. |



*reported as Best Management Practice or as due diligence measure

| Location | Parameter | Event Date(s) (2016) | Result (mg/L except pressure) | Limit (mg/L except pressure) | Corrective Action |
|---|---|---|---|---|---|
| **York Drinking Water System, Stouffville Sub-System** | | | | | |
| Stouffville Elevated Tank | Sodium | April 13 | 52.0 | 20 | Operator attended site, resample taken. |
| Stouffville Fire Hall | Lead | May 24 | 0.0343 | 0.010 | Operator attended site, resample taken; resample result was non-detectable. Original sample taken from indoor non-potable plumbing for MOECC study and does not represent potable supply. |
| Stouffville Reservoir | Free Chlorine Residual | July 4 | 0.00 | 0.05 to 4.0 | Operator attended site, facility returned to normal operation after pressure to facility restored. Compliant grab sample taken. |
| Stouffville Wells 1 and 2 | Free Chlorine Residual | May 26* | 4.69 | 0.05 to 4.0 | Operator attended site, facility returned to normal operation. Compliant grab sample taken. |
| | Sodium | April 14* | 28.5 | 20 | Operator attended site, resample taken. |
| Stouffville Well 3 | Sodium | April 13* | 55.0 | 20 | Operator attended site, resample taken. |
| Stouffville Zone 1 Elevated Tank | Sodium | April 13* | 39.6 | 20 | Operator attended site, resample taken. |
| Stouffville Zone 2 Pumping Station and Rechlorination Facility | Free Chlorine Residual | September 4*<br>November 18* | 4.83<br>5.00 | 0.05 to 4.0 | Operator attended site, facility returned to normal operation. Compliant grab sample taken. |



*reported as Best Management Practice or as due diligence measure

| Location | Parameter | Event Date(s) (2016) | Result (mg/L except pressure) | Limit (mg/L except pressure) | Corrective Action |
|---|---|---|---|---|---|
| **York Drinking Water System, Markham Community** | | | | | |
| Bayview Pumping Station | Combined Chlorine Residual | March 14<br>September 28*<br>October 7 | 0.24<br>0.00<br>4.92 | 0.25 to 3.0 | Operator attended site, facility returned to normal operation. Compliant grab sample taken. |
| Markham Reservoir | Combined Chlorine Residual | October 21 | 0.13 | 0.25 to 3.0 | Operator attended site, facility returned to normal operation. Compliant grab sample taken. |
| McCowan Road PD6 Reservoir | Combined Chlorine Residual | February 2<br>October 9<br>October 11<br>October 31 | 0.25<br>0.21<br>0.13<br>0.00 | 0.25 to 3.0 | Operator attended site, facility returned to normal operation. Compliant grab sample taken. |
| Milliken Elevated Tank | Combined Chlorine Residual | February 13<br>February 15<br>February 16<br>April 4<br>April 6 | 3.16<br>4.78<br>4.54<br>4.51<br>0.04 | 0.25 to 3.0 | Operator attended site, facility returned to normal operation. Compliant grab sample taken. |
| **York Drinking Water System, Richmond Hill Community** | | | | | |
| Jefferson Reservoir | Sodium | April 3 | 20.8 | 20 | Operator attended site, resample taken. |
| North Richmond Hill Reservoir | Sodium | April 3* | 21.8 | 20 | Operator attended site, resample taken. |
| Richmond Hill Bloomington Elevated Tank | Sodium | April 12* | 21.0 | 20 | Operator attended site, resample taken. |



*reported as Best Management Practice or as due diligence measure

| Location | Parameter | Event Date(s) (2016) | Result (mg/L except pressure) | Limit (mg/L except pressure) | Corrective Action |
|---|---|---|---|---|---|
| **York Drinking Water System, Vaughan Community (see also Kleinburg Sub-System)** | | | | | |
| Highway 50 Boundary Valve | Combined Chlorine Residual | June 29* | 3.74 | 0.25 to 3.0 | Operator attended site, facility returned to normal operation. Compliant grab sample taken. |
| South Maple Pumping Station | Combined Chlorine Residual | June 2<br>June 5 | 5.00<br>3.88 | 0.25 to 3.0 | Operator attended site, facility returned to normal operation. Compliant grab sample taken. |



*reported as Best Management Practice or as due diligence measure

## Ministry of Environment and Climate Change Inspection Results Summary from January 1 to December 31, 2016

For all findings in the summary below, the Ministry of the Environmental and Climate Change acknowledged that corrective actions the Region implemented were sufficient.

| Drinking Water System (DWS) | Rating (per cent) | Findings | Corrective Action |
|---|---|---|---|
| Ansnorveldt DWS | Not Applicable | System inspection began in December 2016 but Ministry inspection report was not issued in 2016 | Not Applicable |
| Ballantrae-Musselman's Lake DWS<br>*August 8, 2016* | 100 | *Best Management Practice*:<br>When responding to a chlorine alarm, a grab sample must be taken and documented to confirm analyzer reading | Additional staff training on alarm response was provided |
| Mount Albert DWS<br>*August 8, 2016* | 100 | *Best Management Practice*:<br>A few microbiological samples were taken one day early. Ensure sampling frequency falls within acceptable range, and not ahead of schedule | Sampling schedules and procedure reviewed to ensure compliance with regulated sampling frequencies. Staff reminded to collect samples strictly according to schedule |
| Nobleton DWS<br>*August 11, 2016* | 100 | None | Not Applicable |
| Schomberg DWS | Not Applicable | System not inspected in 2016 due to Ministry scheduling. Ministry will conduct the inspection in Q1 2017 which aligns with the Ministry's annual reporting period of April 1 to March 31 | Not Applicable |
| **York Drinking Water System** | | | |
| Vaughan, Richmond Hill, Markham communities<br>*February 17, 2016* | 100 | *Best Management Practice*:<br>Review reservoir access hatch inspection and maintenance procedures on a regular basis to ensure proper locking and security | These procedures will be reviewed on a regular basis with staff to ensure security is maintained |
| Aurora sub-system<br>*October 4, 2016* | 100 | *Best Management Practice*:<br>Ensure to use the correct sub-system number when reporting an AWQI to the Spills Action Centre | Staff reminded to use the sub-system number when reporting to the Spills Action Centre |

**Attachment 3**

| Drinking Water System (DWS) | Rating (per cent) | Findings | Corrective Action |
|---|---|---|---|
| Holland Landing sub-system | Not Applicable | System not inspected in 2016 due to Ministry scheduling. Ministry will conduct the inspection in Q1 2017 which aligns with the Ministry's annual reporting period of April 1 to March 31 | Not Applicable |
| King City sub-system | Not Applicable | System not inspected in 2016 due to Ministry scheduling. Ministry will conduct the inspection in Q1 2017 which aligns with the Ministry's annual reporting period of April 1 to March 31 | Not Applicable |
| Kleinburg sub-system *August 11, 2016* | 100 | None | Not Applicable |
| Newmarket sub-system | Not Applicable | System not inspected in 2016 due to Ministry scheduling. Ministry will conduct the inspection in Q1 2017 which aligns with the Ministry's annual reporting period of April 1 to March 31 | Not Applicable |
| Sharon/Queensville sub-system | Not Applicable | System not inspected in 2016 due to Ministry scheduling. Ministry will conduct the inspection in Q1 2017 which aligns with the Ministry's annual reporting period of April 1 to March 31 | Not Applicable |
| Stouffville sub-system | Not applicable | System inspection began in December 2016 but Ministry inspection report was not issued in 2016 | Not Applicable |
| **Georgina Drinking Water System** | | | |
| Keswick, Lakeshore, Sutton communities | Not Applicable | System not inspected in 2016 due to Ministry scheduling. Ministry will conduct the inspection in Q1 2017 which aligns with the Ministry's annual reporting period of April 1 to March 31 | Not Applicable |
| Keswick sub-system *January 12, 2016* | 100 | None | Not Applicable |


ENVIRONMENTAL SERVICES

# OPERATIONAL DUE DILIGENCE AND REGULATORY UPDATE 2016

**David Szeptycki and Roy Huetl**

March 2, 2017

## Part 1: Integrated Management System

- Supporting Quality and Performance for Water, Wastewater and Waste Management
- Process Improvement
- Innovation and Research

## Part 2: Operations Update

- 2016 Drinking Water Performance Results
- OMM Achievements
- Municipal Partnerships

**Investment in the Integrated Management System helps to mitigate risk**

# ROLES AND RESPONSIBILITIES FOR IMS

## CORPORATE TOP MANAGEMENT

**Who**
- Council
- Chief Administrative Officer

**Roles and Responsibilities**
- Standard of Care
- Overall Direction for Environmental Services
- Approval of Resources and Budget

Council Report Updates

## OPERATIONAL TOP MANAGEMENT

**Who**
- Commissioner
- Directors
- Managers

**Roles and Responsibilities**
- Strategic Direction for Integrated Management System
- High-level Operational Decision Making
- Drinking Water Quality Management Standard Representative

Management Review • Audits • MOECC Inspections

## WATER AND WASTEWATER OPERATIONS

**Who**
- Water And Wastewater Operators
- Waste Management Coordinators
- Technical Support Staff
- Integrated Management System Coordinators

**Roles and Responsibilities**
- Front Line Operations
- Water And Wastewater Quality Sampling
- Maintenance, Inspection and Asset Management
- Internal Audits and Regulatory Reporting

**IMS provides framework for control and continuous improvement of the Region's drinking water, wastewater and waste management operations**

# *Audits help mitigate risk by self-identifying problems and implementing corrective action plans*

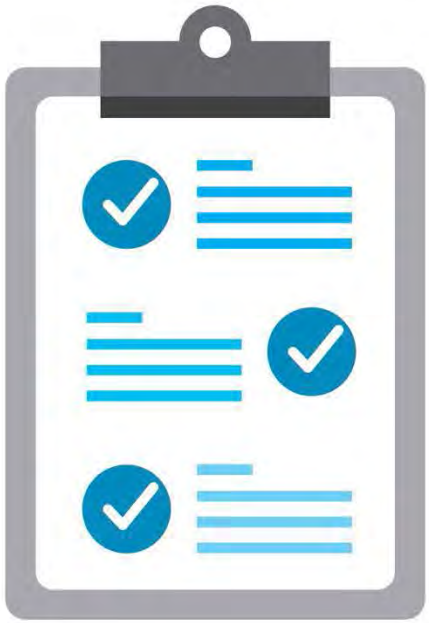
**INTERNAL AUDITS**
46 AUDITS • 57 FINDINGS

**COMPLIANCE AUDITS**
44 AUDITS • 78 FINDINGS

**EXTERNAL AUDITS**
4 AUDITS • 6 NON-CONFORMITIES

**Audits are an integral part of our culture of quality**

# *Integrated Management System Framework Promotes Improvement*

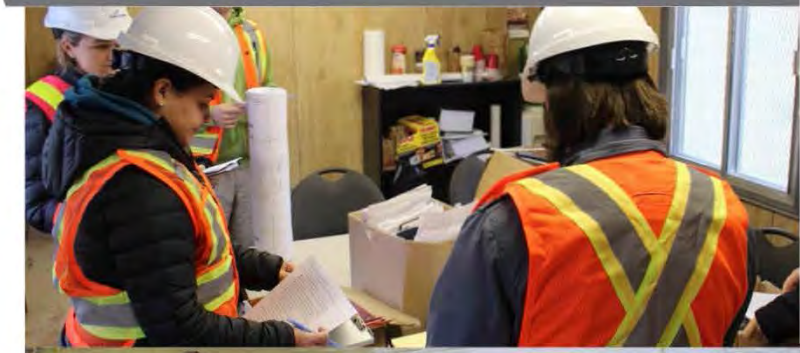


- Collected documentation on 41 Incidents
- Completed 115 Document Change Requests to strengthen procedural documentation
- Closed 70 Non-Conformities
- Performed 582 Periodic Document Reviews

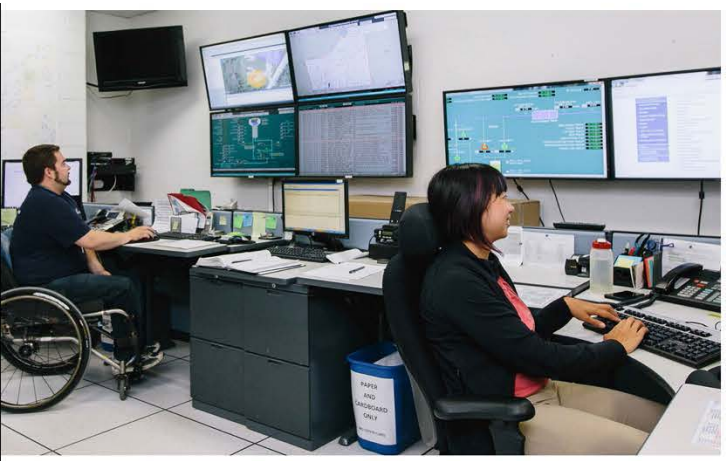
Documenting processes and identifying opportunities for improvement are the foundation of the IMS

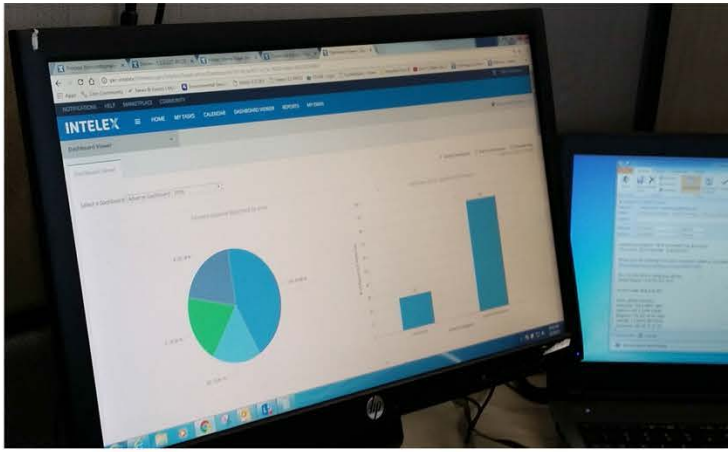
# CULTURE OF QUALITY

- IMS establishes a culture of quality through regular checks and event reviews
- Staff are empowered to make improvements to day-to-day process
- Monthly continuous improvement discussions are held with staff
- Evaluating and documenting incidents to get to the bottom of the issue and prevent reoccurrence



# *Analyzing data gives us key insights into system performance and optimization*






# PARTNERSHIPS DRIVING INNOVATION

- Leverage multi-year partnerships with private and public sectors to stay ahead of regulatory updates and operational challenges
- Research enables innovation through development and use of advanced technologies and techniques throughout the water cycle
- Promote shared knowledge through communication and collaboration across the industry
- Share knowledge and experience on technical committees and through articles published in respected industry and academic journals

DWRG
NSERC CHAIR IN DRINKING WATER RESEARCH

UNIVERSITY OF TORONTO

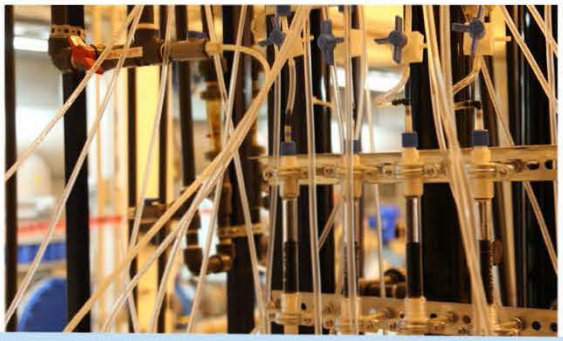
dc water is life®

Schulich School of Business

WaterTAP
Technology Acceleration Project

Canadian Water Network

# 2016 ACHIEVEMENTS



York Region

# *Ontario Chief Drinking Water Inspector's Annual Reports 2014-2016*

| Municipality | Inspection Rating (%) | | Water Quality Tests Meetings Standards (%) | |
|---|---|---|---|---|
| | 2014-2015 | 2015-2016 | 2014-2015 | 2015-2016 |
| York | 99.09 | 99.73 | 99.99 | 99.96 |
| Durham | 98.49 | 99.72 | 99.95 | 99.94 |
| Peel | 98.17 | 96.26 | 99.99 | 99.95 |
| Toronto | 100.00 | 97.46 | 99.45 | 99.65 |

York Region achieved the top score in the GTA in the Ontario Chief Drinking Water Inspector's report

# INSPECTIONS AND MONITORING

| System | # MOECC Inpsections Completed | # Non-Compliance Findings | # Best Practice Recommendations |
|---|---|---|---|
| Water | 9 | 0 | 4 |
| Wastewater | 2 | 4 | 2 |

**18,489**

**LABORATORY ANALYZED TESTS**

RESULTED IN

25 ADVERSE TEST RESULTS

[14 Sodium • 4 Microbiological • 4 Inorganic • 3 Non-Regulated Organic]

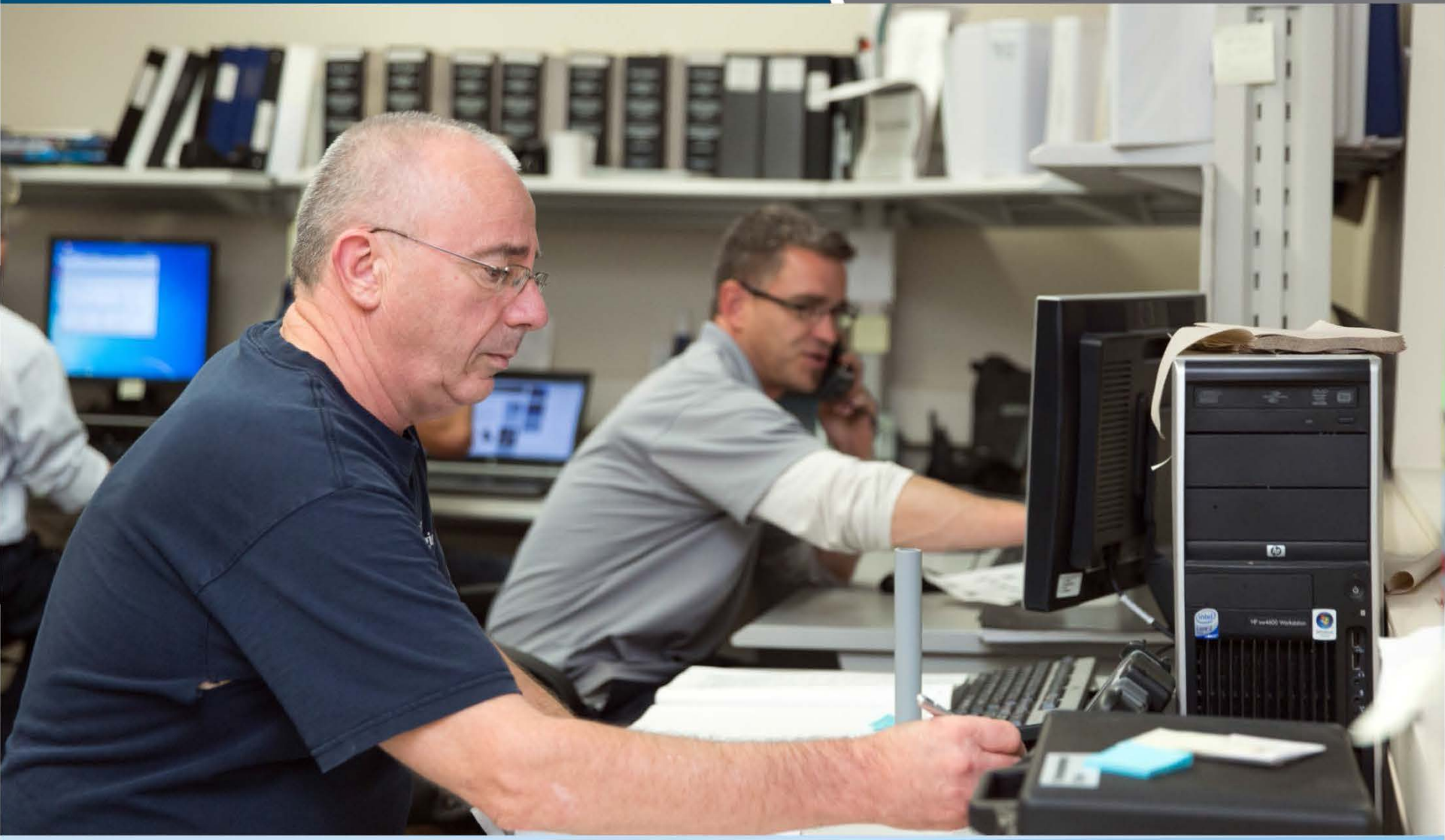
**31 MILLION**

**CONTINUOUS MONITORING ANALYZER READINGS**

RESULTED IN

89 ADVERSE READINGS

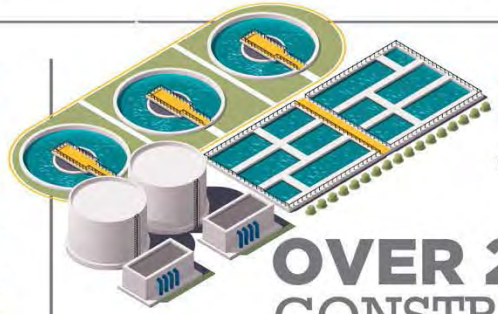
[51 High Chlorine Residual • 21 Low Chlorine Residual • 7 High Fluoride • 10 Low System Pressure]



**OVER 51,000 WORK ORDERS COMPLETED**

SUPPORTED DESIGN AND CONSTRUCTION OF **OVER 75KM** OF **TRUNK SEWERS AND WATERMAINS**

**OVER 330** INDUSTRY SEWER USE **INSPECTIONS**



**SUPPORTED 42 CAPITAL PROJECTS** WITH **OVER 24** IN ACTIVE CONSTRUCTION PHASE

**DELIVERED OVER 120 BILLION** LITRES OF WATER

**OPERATED OVER** 215 INFRASTRUCTURE **COMPONENTS OR FACILITIES**

**ZERO BOIL WATER** ADVISORIES SINCE 2004 OR **WATER RESTRICTIONS SINCE 2008**

# COOPERATION WITH PARTNERS














FATS, OILS AND
GREASE (FOG)
Cool it, Scrape it,
Green Bin it.
york.ca/fog
PROTECT
YOUR
PIPES!
York Region
ENVIRONMENTAL
MONITORING
AND
ENFORCEMENT

# COOPERATION WITH PARTNERS

Brought to you by

OCWA

ONTARIO CLEAN WATER AGENCY
AGENCE ONTARIENNE DES EAUX

CleanWater Foundation

In partnership with

The City of BARRIE

Bradford West Gwillimbury
A Growing Tradition

Mississippi Mills

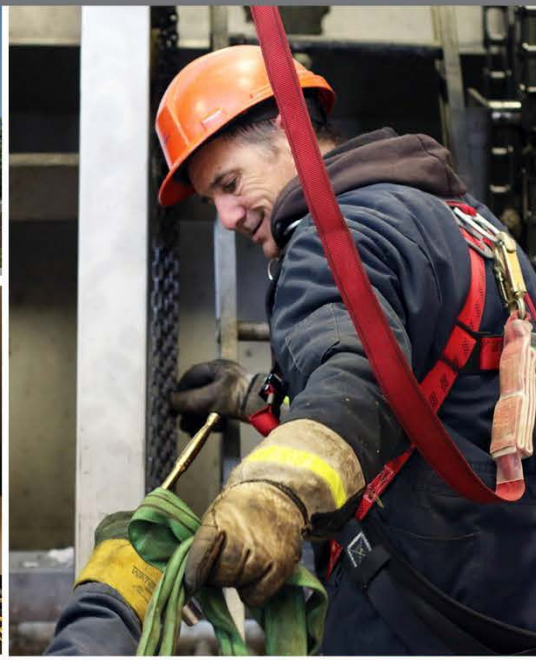
Niagara Region

York Region

I don't flush

idontflush.ca

# OPERATIONAL EXCELLENCE


"Step forward and take a bow Region of York water department.
Oh, and whatever you're putting in the water these days? Keep it up."

- John Cudmore, Sports Editor, Yorkregion.com